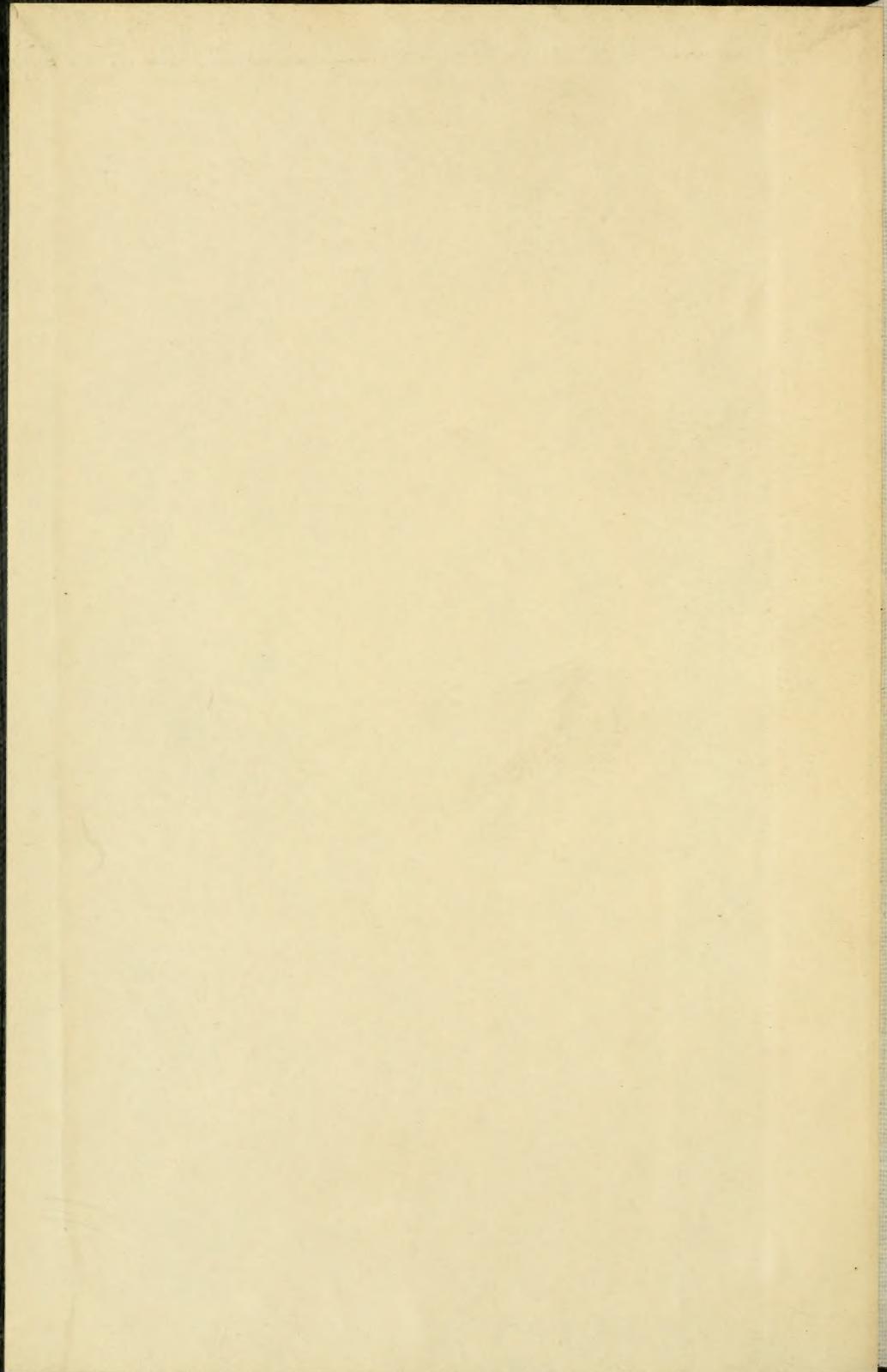


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THE  
JOURNAL  
OF THE  
AMERICAN SOCIETY OF  
ENGINEERING CONTRACTORS



VOLUME V — No. 1  
JANUARY, 1913

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Published Monthly, except July and August, at the Rooms of the  
AMERICAN SOCIETY OF ENGINEERING CONTRACTORS  
11 Broadway, New York City, N. Y.

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17-27 VANDEWATER STREET  
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# AMERICAN SOCIETY OF ENGINEERING CONTRACTORS

11 BROADWAY, NEW YORK, U. S. A.

PAPER No. 48

## DEVELOPMENT OF THE MODERN COUNTRY ROADWAY\*

BY

GEORGE C. WARREN.†

(Member of the Society.)

It is the purpose of this paper to discuss the Country Roadway as distinguished from the the City Pavement, and to briefly outline its development from the period of the pioneer work of John MacAdam, who lived from September 21, 1756, to November 26, 1836.

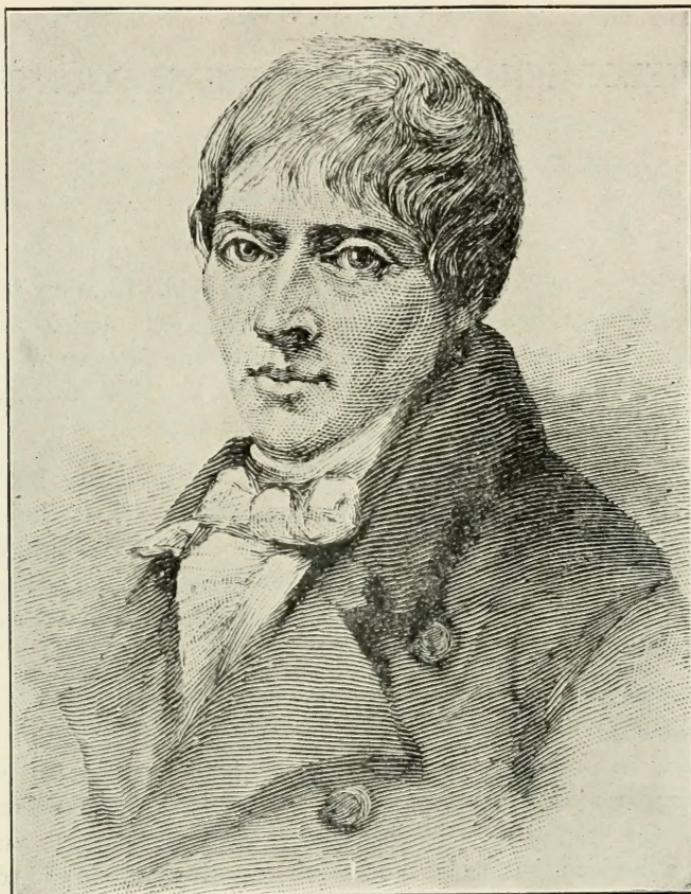
The speaker is indebted to an article by Honorable Maurice O. Eldridge, headed : "John Loudon MacAdam, the Road Builder," published in "Good Roads," June 1, 1912; for the photograph of MacAdam, and some of the facts therein related, regarding his life and work, as well as for the photographs of cross sections of the evolution of the Macadam Road.

Without reference to John MacAdam, whose name is immortalized and who invented the macadam road, or rather put his ideas in practical use in the year 1816, no outline of highway construction can be complete. He was the first to develop and, as far as possible with crude tools then available, to put in practice the idea that, to be successful, a roadway made of broken stone must be as solid as possible. MacAdam was the first to realize that drainage is an all important factor in successful road building and that, with a well drained, graded and compacted subsoil, success requires much less road metal than had been previously used. He says "native soil, which really supports the

\* Paper read at the regular monthly meeting of the Society, December 12th, 1912.

† President, Warren Brothers Company, Boston, Mass.

weight of traffic, while it is preserved in a dry state, will carry any weight without sinking. \* \* \* A covering impenetrable to rain must then be placed over it. \* \* \* The thickness of a road should only be regulated by the amount of material neces-



JOHN MACADAM—1756-1836.

easy to form such impervious covering." Over the subsoil MacAdam spread a layer made of pieces of crushed stone, about "six ounces in weight," say about two (2) inch size, and over this laid a succeeding layer of finer size, the whole of which was con-

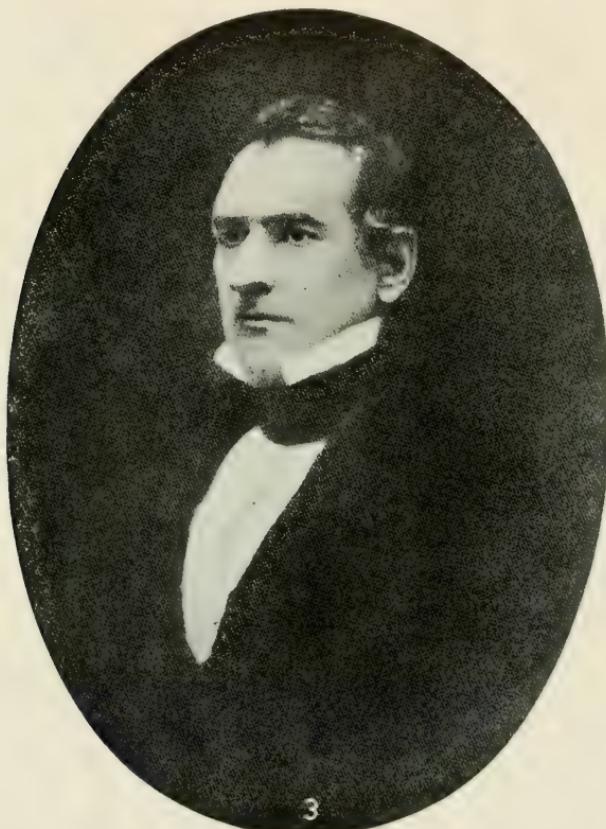
solidated and compacted as fully as possible with the equipment available depending largely on the detritus from traffic for the necessary fine material for binding the stone. This was a great deal to accomplish in an age when neither stone crushers nor steam rollers had been invented, and consequently the stone had to be broken by hand and compressed by either hand or horse rollers, supplemented by traffic.



THOMAS TELFORD.

Thomas Telford, a close contemporary of MacAdam, born 1757, died 1834, contributed what is generally regarded as an improvement in the lower course of broken stone roads. Telford laid the foundation of large quarried stone on the narrow side or end, so that the sharp edges of the foundation stone extended upward and, theoretically at least, enabled the more firm bonding of the foundation course to the next course of broken stone. Telford and his followers believed that the larger stone at the bottom

provided a more solid foundation. Both Telford and MacAdam were in part correct in their ideas of the best preparation of the foundation and the modern macadam road is a combination of the ideas of MacAdam and Telford.



3

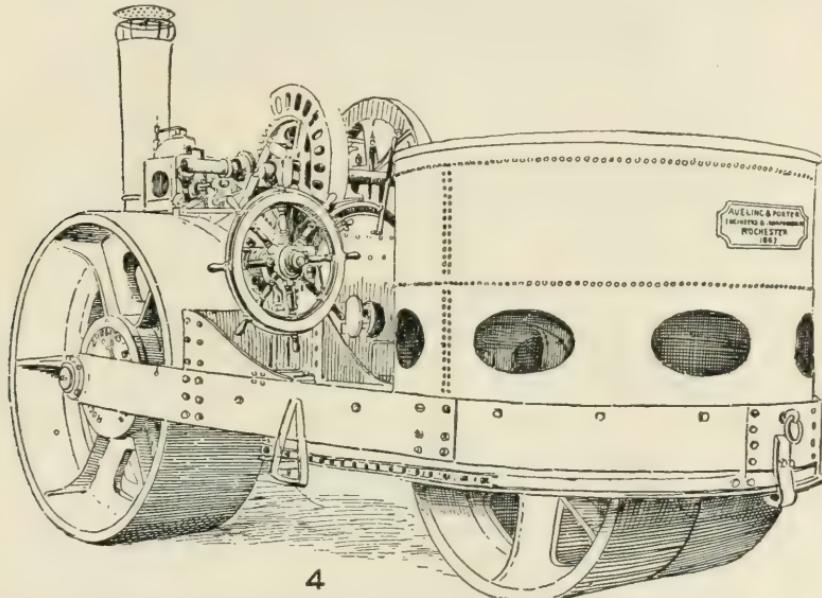
ELI WHITNEY BLAKE, INVENTOR OF THE FIRST STONE CRUSHER—  
1795-1886.

Two equally important epochs in road building came when Eli Whitney Blake of New Haven, Connecticut, who was born in Westboro, Mass., January, 17, 1795, and died in 1886, and who was a nephew of Eli Whitney, inventor of the cotton gin, invented the first stone crusher in 1858, and when in 1859 Louis Lemoine of Bordeaux, France, invented the first steam roller.

The nearest early approach to the modern steam road roller was built by Aveling & Porter of Rochester, England, in 1863.

The following is quoted from a well merited eulogy of Mr. Blake, written by Hon. James H. MacDonald, State Highway Commissioner of Connecticut.

"In 1851 the town of New Haven passed a vote to macadamize Whalley Avenue from New Haven to Westville, presumably from the city line to the West River. The distance was not over one and one-half miles. Mr. Eli Whitney Blake was selected as one of the committee to take charge of the construction of the road. The stone was broken with hammers and the construction of the road required about two years. The



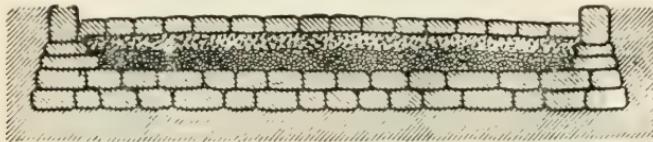
FIRST AVELING & PORTER STEAM ROAD ROLLER, BUILT 1863.

process of breaking the stone was very slow, and someone suggested that a more rapid method of breaking the stone to be used, and as a result of this suggestion a furnace grate was used and the stone to be broken was placed upon the grate and a trip-hammer was introduced as the force necessary to break the stone to the size required. This method was abandoned after a very short time by reason of the fact that it was found very unsatisfactory, but while watching the trip-hammer at work in reducing the stone to the size required, Mr. Blake was furnished an idea upon which he went to work; as a result he evolved the principle which, to a greater or less extent, is used upon every crusher since manufactured and in use to-day. Mr. Blake secured his patent in June, 1858.

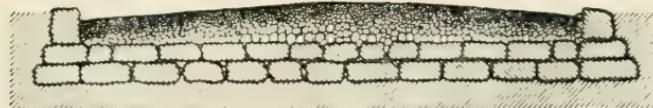
"The stone crusher was used for the first time in Central Park in making some improvements that were necessary in which a concrete base was required, but the first municipality ever using a stone crusher for the

improvement of highways was the City of Hartford, which purchased two machines in 1859 and 1860; so that the State of Connecticut not only has the distinction of having one of her citizens invent the stone crusher, but also has the additional reason to feel proud by reason of the fact that one of her chief cities was the first in the world to use a stone crusher in road improvement.

"The world owes to Eli Whitney Blake a lasting debt of gratitude and the perpetuation of his name for all times as one of the great inventive minds of the country; and so long as macadam roads continue to be constructed and used by the traveling public, just so long the name of Eli Whitney Blake will be an honorable one, and go down to posterity as one of the great inventors of his age."



Cross section Roman road.



Cross section French road (Roman method) previous to 1775.



Cross section of Tresaguet road, 1775.



Cross section Telford road, 1820.



Cross section of original macadam road, 1816.



Cross section of modern macadam road.

The illustration of steam roller is copied from a paper read before the Incorporated Association of Municipal and County Engineers at Brighton, England, June 25 and 26, 1896, by E. Pennell Hooley.

With these improvements in tools, the building of macadam roads became more economical and successful, and it was discovered that by rolling into all the courses the fine crushed stone, pulverized by the crusher, of which but little was produced by the hand broken stone of the MacAdam era, and, through the greater compression of the steam roller, it was not necessary, on ordinarily sound subsoil with proper drainage, to use as large stone as Telford used in the bottom, nor to use as great a depth of road metal, and that, depending on the subsoil condition, from six to twelve inches of well-compacted stone laid in layers was sufficient.

Colonel Albert A. Pope, who was born in Boston May 20, 1843, and died at his summer home, Cohassett, Mass., August 10, 1909, was the first man in the United States who, in an organized way, heralded the importance of the general improvement of the country highway by the laying of a better class of road than the poorly rounded up natural soil, which was the nearly universal condition of the country road at the time of Colonel Pope's work in this line. Always foremost in public improvements and particularly in everything which pertained to the ease and comfort of traversing the public highway, Colonel Pope began giving public talks on "Good Roads" and, entirely at his own expense, began a new well-organized campaign of education, including the circulation of tons of road literature and traveling throughout the country lecturing to civic bodies, boards of trade, etc. Colonel Pope was at that time interested in the manufacture of the bicycle. As the first manufacturer he was the pioneer in the introduction of the bicycle in the United States and was always foremost in the maintenance of the highest grade of bicycle as, with the advent of the automobile, he subsequently became always in the fore-rank of that development. His work in connection with the bicycle business and the wretched condition of the country roads brought to Colonel Pope's attention the importance of improvement along this line. The writer remembers that in the early stages of Colonel Pope's addresses he urged that if nothing

more could be done for the present, that cinder bicycle paths be built so that the owners of bicycles, then having the vehicular means, would be provided with the conditions making it possible for them to travel into and enjoy the country air and scenes. As an immediate result of this line of campaign the writer remem-



COLONEL ALBERT A. POPE—1843-1909.

bers that bicycle clubs were organized throughout New York State and hundreds of miles of cinder paths were built in that State where, prior to that time, practically every street outside of the cities and villages was impassable with any degree of comfort during the early spring and late fall, at which seasons the country is most attractive and invigorating. Similar develop-

ments on smaller scales resulted in other states. This development of bicycle paths may fairly be said to be the beginning of the general appreciation in this country of the importance of providing easy, comfortable means of locomotion between the cities and the rural districts of the country, and Colonel Pope's untiring efforts toward enactment of Federal and State legislation may be said to be the beginning of the present work of the United States Agricultural Department in connection with the Good Roads Development and of the State Highway Departments, through which hundreds of millions are being expended and the development is rapidly extending into billions of dollars.

In this connection it is interesting to note that during the years 1896 to 1898, before the City of New York had pavements to any considerable extent of any character other than rough granite blocks, the city provided for asphalt bicycle paths four feet in width next to the curb on its principal thoroughfares. During that period the City of New York built 9 miles of asphalt bicycle paths on its principal streets.

Through his untiring efforts and the presentation of a monster petition, the Congress of the United States in 1893 made an appropriation of \$10,000 to enable the Department of Agriculture to investigate the condition of the roads throughout the country. The present "Office of Public Roads of the Department of Agriculture" is the direct outgrowth of this small beginning. The legislatures of many of the States were first aroused from their lethargy and adopted measures looking toward general highway improvement through Colonel Pope's earnest activity for Good Roads.

Through Colonel Pope's generosity the Department of "Highway Engineering" at the Massachusetts Institute of Technology was established and maintained for several years.

He was instrumental in securing the appointment of the first Massachusetts Highway Commission which has not only done and is still doing excellent and largely pioneer work in Massachusetts,

but is also the basis of organization which has been largely followed by other states.

The following brief extracts selected from many newspaper articles of that period in various parts of the country, attest to the broad scope and incalculable value of Col. Pope's work.

"Col. Pope has made a careful study of the subject, and has collected valuable data, which show that good roads and higher civilization go hand in hand."

"Col. Pope's solution of the problem, and the one that promises best success, is the establishment of a department in colleges in which the construction and maintenance of improved roads shall be taught with the same thoroughness which is now devoted to the preparation of young men for railway and hydraulic engineering."

"Col. Albert A. Pope has at least succeeded in bringing the Congress of the United States to take a hand in the movement for better roads, and also to investigate the agricultural interests of the country. This is of the utmost importance to citizens in general, and to farmers in particular."



JAMES H. MACDONALD.

The memory of Colonel Pope should and will extend down through history in connection with his public spirit and progress in the earliest days of general country road development.

Of the men now living, no one has contributed more to the art and practice of successful macadam road building than James H. MacDonald who, following a close study of practical road building with his father, has been since 1895 and still is the Highway Commissioner of the State of Connecticut, the macadam



WILLIAM PIERREPONT WHITE OF UTICA, N. Y. ONE OF THE PIONEERS IN THE GOOD ROADS MOVEMENT.

roads of which state to-day stand the peer of any roads of that class in the world.

So we may fairly conclude reference to the development of the macadam road with the statement that it stands chiefly to the credit of five men of genius and sound-headed practice,—MacAdam, Telford, Blake, Lemoine, and MacDonald.

It is well here to digress to point out two prominent errors of application of MacAdam from causes which still largely prevail in country road construction—too little intelligent consideration

of the local conditions, especially of subsoil and drainage, and too great an effort to get something at low cost—in short, to get for fifty cents what cannot be purchased without the expenditure of a whole dollar. Low cost and high grade construction never have gone and never will go together.

The writer, then residing in Utica, N. Y., was one of the Charter Members of the Oneida County League for Good Roads, organized in the year 1893, and one of the pioneer organizations in encouraging road development west of New England. The Secretary of that Society, then a quite young lawyer, was William Pierrepont White, who soon became the chief factor, not only in the Oneida County League, but in the larger Good Roads Convention of the Boards of Supervisors of New York State, of which he was chairman of the Executive Committee for seven years. No one is more entitled to the thanks of the community for bringing about a sentiment of the people in farming communities favorable to highway improvement and for drafting paving laws for State aid, together making such improvement possible, than William Pierrepont White, of Utica, N. Y.

In a private letter Mr. White writes:

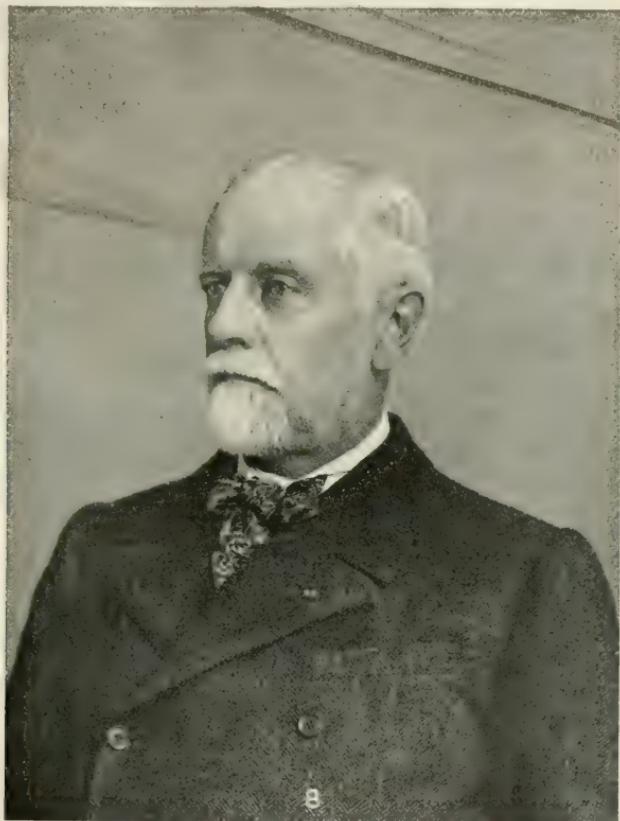
"A review of 23 pamphlets—the first one published in December, 1900, and the last one in March, 1908, gives the history of country road development as worked out in the State of New York, and are the pamphlets, with the reasonings, which led to the \$50,000,000 bond issue in New York State.

"The Supervisors' Conventions met for seven years to annually discuss the plans and the procedure for the future.

"New York State was the first state to undertake to provide herself with a credit in order that she might have money to progress highway improvement.

"Copies of the pamphlets were regularly sent to all of the supervisors and town officials in the State of New York. There are 933 townships, with approximately seven town officials each. In addition to placing this information directly in the possession of each town official, I was in communication with the 1,000 up-state newspapers, daily, weekly and semi-weekly, furnishing them with short readable notices in regard to the plans which the Executive Committee were approving from year to year as the highway situation developed in this State. The papers of the State published this information willingly, and thus the voters of the State became gradually in touch with the purposes of road improvement and the bond issue. No agitation in support of improved highways had ever before been brought thus closely in touch with the people, and it was because of this close touch with the people that the bond issue was carried when submitted to them for their approval."

The State of New York is entitled to credit as one of the first in the practical development of highway improvement, and Oneida County as the chief firing line under the generalship of William Pierrepont White, is fairly credited with leading the State of New York on these practical lines.



GEN. ROY STONE—1836-1905. THE FIRST DIRECTOR OF PUBLIC ROADS OF THE UNITED STATES AGRICULTURAL DEPARTMENT.

General Stone was born at Prattsburgh, Steuben County, N. Y., October 17, 1836, and died in 1905.

Educated at Union College, Schenectady, as a Civil Engineer, he entered the United States Army at the breaking out of the Civil War. Serving gallantly throughout the war; wounded in

the battle of Gettysburg, he was breveted Brigadier General of Volunteers on September 7, 1864, and resigned from the Army January 27, 1865, but re-enlisted at the opening of the Spanish War and was appointed on the staff of Lieutenant General Nelson A. Miles, and on January 3, 1898, was appointed Brigadier General and honorably discharged December 31, 1898.

General Stone has the fair distinction of "Father of the National Good Roads Movement." March 3, 1893, the President approved an Act of Congress in pursuance of which General Stone was appointed a special agent to take charge of the inquiries in regard to the system of road management, and the best methods of road making in the United States under the Agricultural Department, which position he filled until 1898, when he resigned to re-enlist in the United States Army. On January 31, 1899, he was appointed the first "Director of the Office of Public Roads," from which he resigned October 23, 1899.

He helped to frame and to secure the passage of the New Jersey State Aid Law, and was the secretary of the National League for Good Roads. A meeting of that League was held in Chicago during the Worlds Fair, and during the early part of 1893 another meeting was held in Washington, which resulted in the establishment of the Office of Public Roads. General Stone helped frame the Higbie-Armstrong State Aid Law for New York and was largely instrumental in securing the passage of other progressive road legislation in the various States. He was among the first in this country to advocate parcels post, rural free delivery and postal savings banks. He made a special trip to Europe to secure information on these subjects and later prepared numerous magazine articles and made a number of addresses in different parts of the country on these topics. It was at General Stone's suggestion that California adopted the plan of using prison labor to crush rock for road building. This plan has since been adopted by several other states. General Stone was the inventor of a cart for spreading rock, a stone boat for moving stone from quarry to crusher, a suction dredge for harbor work, an automobile bus, and various other labor saving devices.

At the first meeting of the Oneida County League for Good Roads, General Roy Stone, then recently appointed to the newly created office of Director of Public Roads of the United States Agricultural Department, addressed the meeting. General Stone did a great deal in his time to overcome the strongly rooted prejudice of the agricultural community in opposition to any plan of road building except for each individual to "work out the road tax"—some by clearing their farms of field stones and throwing them into the holes in the road, others by plowing out the gutters and throwing the sod into the nearest part of the road which would receive it, and others by any other most unintelligent "assistance" (?) of which they could conceive and which "worked off the road tax" with the least possible trouble.

In that address before the Oneida County League for Good Roads, the burden of General Stone's remarks was to show how the farmer could get a road at little cost and he referred to a road then recently built in Canandaigua, N. Y., at a cost of only \$800 per mile.

Of course such roads were of short duration, but they did serve the extremely important purpose of showing the farmer, for a few weeks at least, that if he could have a road surface like that for all time it would be of immense value in getting his produce to the market, his children to school, and in intercommunion between families in sparsely settled communities.

At that period, in New York State and in nearly every other State west of New England and south of New Jersey, there was scarcely a country road of any description except the natural soil, generally clay and poorly graded, "tinkered at" as above described by the "work-out-the-highway-tax" system.

#### PENNSYLVANIA.

Next to New York State, Pennsylvania is at present doing the most modern improvement of its highways. The Pennsylvania legislature in 1911, under the "Sprout Act," appropriated five million dollars for new State and County roads. This Act provides

for the State paying fifty per cent. and Counties and Townships fifty per cent. of the cost. At a State election in the Spring of 1913 a vote will be taken on an amendment to the State constitution permitting the State to issue bonds for State Highways. It is understood that the legislature is providing a bond issue of fifty



HON. EDWARD MANNING BIGELOW, PENNSYLVANIA STATE HIGHWAY COMMISSIONER.

million dollars for that purpose. The judicious expenditure of this amount will make Pennsylvania, with the possible exception of New York, the peer of all the states in the Union in its system of improved state highways. The taxpayers of New York State have at the recent election approved a similar bill appro-

priating \$50,000,000 for road improvement. The appropriation of these large sums shows to what proportions the country road development has grown during the past 15 years, and doubtless for years to come will continue to grow by leaps and bounds.

Mr. Bigelow is a Civil Engineer whose training has especially fitted him for the high position of Pennsylvania State Highway Commissioner, to which he was appointed in 1911. Mr. Bigelow was Director of the Department of Public Works of the City of Pittsburgh during the years 1888 to 1906, inclusive, and during his administration built the Grant and Beechwood Boulevards, twelve miles in length upon the most improved modern lines at that time, 8 inch Telford base and 4 inch macadam surface, and during the year 1908 resurfaced Grant Boulevard with asphaltic concrete, which has stood the severe test of being the most traveled highway in Pittsburgh. One of the most remarkable achievements standing to the credit of any man is that of the magnificent Pittsburgh Park development under Mr. Bigelow's administration of the Department of Public Works in that city. This park development including:

Schenley Park.....	422 acres
Highland Park .....	366 acres
McKinley Park.....	63 acres

and many similar parks located in thickly populated districts, ranging from 2 to 18 acres, used as public commons or playgrounds, making an aggregate of approximately 900 acres of improved park system in the City of Pittsburgh, including 50 miles of improved roads. The entire development, including the acquiring of the land for park purposes, was under the administration of Mr. Bigelow.

Illustrating the high regard in which Mr. Bigelow is held by his fellow citizens, reference is here made to the remarkable distinction of there being erected to his memory by private subscription of the citizens a magnificent statue located at the main entrance to Schenley Park.

As State Highway Commissioner, Mr. Bigelow has his work well organized under fifty superintendents; covering 66 counties; 15 engineering corps; and the general engineering department with main office at the State Capitol in Harrisburg.



This map of projected route of the California State Highway System and the following data regarding the proposed highway work of that State are taken from a paper by Austin B. Fletcher, Engineer of the State Highway Commission, read before the Pacific Highway Association in San Francisco, August 5, 1912.

"In November, 1910, the citizens of California voted an \$18,000,000 bond issue for the construction of a state highway system. The members of the State Highway Commission to have charge of this work were commissioned by the Governor on August 7, 1911, and thus they have been engaged in their duties for a little over a year. During this time much preliminary work has been accomplished, and in addition 37½ miles of state highway have been placed under contracts and bids have been received on 56 miles more.

The routes selected make a total length of approximately 2,300 miles. To complete the system apparently contemplated by the statute several hundred miles more of laterals and connections must be provided for.

Approximately 1,500 miles of road survey have been ordered by the commission, and of this mileage nearly 800 miles of field work has been completed, and more than 200 miles in addition is in process. The road which the commission proposes to build will have the following principal characteristics:

1. A right of way not less than 60 feet in width where it is reasonably possible, and as direct between objective points as is consistently possible.
2. Gradients not exceeding 7 per cent., even in the mountainous parts of the State.
3. Curves as open as possible, and in no case of less than 50 feet in radius
4. As many culverts of sufficient capacity as are needed to take care of surface and underground water.
5. A traveled way under ordinary conditions not less than 21 feet in width, and in the mountains not less than 16 feet wide, with the center paved or surfaced so as to be hard and smooth under all climatic conditions at all times of the year, the width of surfacing to be in general 15 feet.
6. Smoothly graded roadsides, reserved for future tree planting."

That the engineers of California are awake to the importance of adopting high grade construction and avoiding make-shift construction based on a desire to spread available funds as far as possible, is shown by the following extracts from report of special committee to the League of California Municipalities, consisting of C. P. Jensen, City Engineer of Fresno, Cal.; S. J. Van Ornum, City Engineer of Pasadena, Cal., and J. J. Jessup, City Engineer of Berkeley, Cal.

"We have nothing but the highest commendation for the Commission's choice of main routes covering a total mileage of approximately 2,300 miles, which added to about 400 miles of lateral highways extending out to more or less isolated county seats will bring the grand total in the neighborhood of 2,700 miles. If the \$18,000,000 was to be spread equally over the entire 2,700 miles, the cost per mile, including engineering overhead charges etc., would be restricted to \$6,667 per mile. Everyone conversant even in small degrees with road building will appreciate the fact that good roads of standard designs cannot be con-

structed for that amount of money, and will, therefore, realize at least one of the difficulties confronting the Highway Commission in carrying out the spirit of the act itself.

"For the main roads of the system the choice for surfacing seems to be between the so-called oil-macadam type and a concrete road with a brilliant surface, the latter being considerably more expensive than the former, but much more durable as concerns quality and permanency. It is evident that neither type can be adopted for general use unless the cost of the materials and the freight charges for transporting them are reduced to the lowest possible point.

"It seems apparent that not less than 2,700 miles of the State Highway must be built to comply with the provisions of the 'State Highway Act.' Of this mileage it is possible that one-third, or 900 miles, will be in the mountains, and will require no surfacing other than local gravel, and that 1,800 miles will have to be surfaced with materials more or less expensive.

"We would submit that it is our opinion that a plan of procedure which would best fulfill the requirements of the Act would be that where pavements are constructed at all they be constructed of a character which is known to be the most durable, permanent, and practicable under local conditions; this, of course, would mean that a smaller percentage of paved roads and a greater proportion of graded roads would be constructed. We feel that whatever work is done should be done with the end in view of securing the best pavement known to highway builders to-day, thus reducing to the smallest degree possible the factor of future cost of maintenance, for which, by the way, no specific provision has been made to our knowledge. We believe that even though some localities would have to be satisfied with an ordinary graded highway, or perhaps an oil surfaced highway under the present bond issue, this would be a far better course to pursue, not only for the reason that the best pavement is none too good; for the further reason that when the bond issue is exhausted the Commissioners could go before the people and claim that whatever work was done had been done according to the best known construction, and that the graded roads would be finished and could be used as sub-grades for future pavements if the people would see their way clear to vote an additional bond issue.

"There can be no question but that the present bond issue is inadequate to serve all communities with a comparatively permanent pavement, and we believe it far better policy to have good work done as far as can be, then to make an effort to serve all communities by half-way measures. Mediocre or experimental pavements can only result, in a very few years at the most, in a roadway which will be extremely expensive to maintain, and probably need re-construction, but will result in serious reflection upon the ability and foresight of the Commission. If our plans would be carried out, all work done would be of permanent character, either in completed pavement or as a material step toward such a completed pavement, and we further believe that the matter could be placed before the people in such a manner as to prove to them that the expenditures that were to be made were made to the best advantage, and thus gain their confidence to such an extent that they will be glad to provide the means necessary for the continuance of the good work.

"In the matter of oil macadam, we wish to say that it does not meet with our approval. This form of pavement is comparatively new and has, in fact, not been in use long enough to give us an opportunity

of judging of its permanency or durability. Some of our highway pavements laid with oil macadam three or four years ago have resisted disintegration fairly well; perhaps more of them, however, have shown a considerable degree of disintegration and depreciation. Oil macadam constructed by the penetration method cannot be built with sufficient uniformity to prevent more or less disintegration or a soft spongy surface. If constructed by the mixing method we claim that the additional cost of asphalt over oil would be so immaterial that asphalt concrete would be far preferable. In thus reporting adversely with reference to oil macadam pavement the very important item of maintenance, which for this pavement will be large, is given consideration.

"For this expense, as above mentioned, no provision has yet been made and which must probably fall upon the various counties in which such pavements lie.

"As a commentary on the matter of oil macadam, we would call to mind that Los Angeles County alone spent \$3,500,000 on oil macadam highways, and that in the latter part of 1911, when practically all of the bond issue was spent the Grand Jury of the County met and in a final report stated, as we recalled the words, 'that the oil macadam roads in Los Angeles County were an absolute failure.'

"It is our belief that particularly up and down the San Joaquin Valley motor trucks will come into use immediately upon the completion of the highway for the purpose of transporting freight from terminal points, and this factor should be taken into careful consideration before specifications are adopted for such highways. In all other respects, as far as the information has come before us, plans of work contemplated by the Commission are very excellent and worthy of recommendation.

"In conclusion we would remind your body that approximately 70 per cent of the burden of taxation will fall upon the incorporated cities. If poor pavements, or experimental pavements, are laid between cities they will be the greater sufferers and would, therefore, have the best right to be heard in the matter of pavements. In view of the seriousness of adopting improper specifications we would recommend that you give the matter your careful and immediate attention."

The specifications of the Highway Commission of San Joaquin County, Cal., above referred to, under which 141,397 square yards equal to over 17 miles of roadway, 14 feet wide have been laid, are typical of this class of construction as laid in California, and are as follows:

#### ASPHALTIC MACADAM (CONCRETE).

"Upon the foundation prepared with or without gravel, as specified elsewhere, shall be laid the asphaltic concrete wearing surface. It shall be composed of gravel or crushed rock, sand, fine absorbent mineral dust, and asphaltic cement in such quantities as to conform the mixture to the following proportions by weight:

Gravel or crushed stone .....	55%—65%
Sand .....	24%—35%
Mineral dust .....	5%—8%
Asphaltic cement .....	6%—9%

## GRAVEL OR CRUSHED STONE.

"If gravel is used in the asphaltic macadam it must fulfill the requirements necessary for its use in hydraulic concrete. It shall be hard and sound, and shall not contain more than five (5) per cent. of loam or organic material. It shall range in size from two (2) inches to one-fourth ( $\frac{1}{4}$ ) inch.

"If crushed rock is used it shall be a variety of sound, hard rock that would be suitable for hydraulic concrete, and must range in size from that retained upon a two (2) inch screen to that retained upon a one-fourth ( $\frac{1}{4}$ ) inch screen."

The roads are laid under license of the patents of the late F. J. Warren.

## NEW YORK STATE.

Returning to New York State, the first bill which authorized expenditure for State Highway Improvement was Chapter 115, Laws of 1898, which was passed through the hardest educational efforts of Good Roads enthusiasts and against the bitter opposition of many if not most of the rural communities. The 1898 New York State Road Law providing for State Aid was similar to a law passed in New Jersey in 1891, which became operative in 1892, in which the appropriation was \$25,000, at that time regarded as a liberal expenditure on the part of the State of New Jersey in behalf of Good Roads.

In the matter of construction of the early roads, New York State naturally turned to the adjoining states of Massachusetts, Connecticut and New Jersey, which stood pre-eminent in early highway construction, and there learned what experience had shown that, generally speaking, road metal spread six to nine inches deep and compressed to four to six inches respectively, was ample. Unfortunately, however, New York State did not give due consideration to the fact that in Massachusetts, Connecticut and New Jersey the natural ground is, generally speaking, (except on Cape Cod, where sand prevails), either solid stone, or gravel, affording both a natural foundation and drainage, while in New York State, almost universally, the natural soil is clay, affording neither foundation nor drainage. Consequently the early roads of New York, which cost millions to build, were destined to rapidly deteriorate, even if the advent of the automobile had not hastened the destruction.

Resurfacing and reconstruction at the expenditure of many more millions was then the order of the day, and with the rapidly increasing automobile traffic the reconstructed roads proved even worse than the original construction, and in 1909, Hon. Richard D. Sherman of Utica, New York, an engineer of keen observation and wide experience, reported:

"The State of New York, together with its subdivisions of counties and towns, has already expended many millions in the construction of highways outside of the territories of cities and villages, but, unfortunately, has in the last few years failed to maintain such highways in a proper state of repair.

"A new condition has come almost suddenly upon us during the past five years, in the motor-driven vehicle or automobile, and the road-building profession does not deny that the practice of the past century fails to meet the necessities of the new conditions. That the State of New York has gone not only far enough, but a great deal too far, in the construction of macadam roads of the design and character so far followed, is made very clear by Hon. F. W. Skene, State Engineer and Surveyor of 1907-08, in his final annual report to the Legislature.

"'The broken stone road of to-day,' says that report, 'is the result of more than a century of development. Until the advent of the motor car the broken stone roads were satisfactory, but conditions have now changed. The macadam road of to-day is being rapidly denuded of its binding material and its wearing surface disintegrated. The construction methods of the past will not meet the requirements of the future or even the present.'

"Mr. Skene points out that 809 miles of highways were completed during 1908, making a total of 1,787 miles built since the highway appropriations were authorized; that there are now under contract 520 miles, and 1,039 miles, estimated to cost \$10,624,910, are awaiting contract.

"Here is an astonishing official statement as to what the great State of New York, together with its counties and towns, is doing in highway construction. That the character of construction so far carried out is utterly unsuited to existing traffic conditions, the ex-State Engineer makes very clear."

Following the year 1909 in New York and pretty generally elsewhere, began the era of what has since proved to be the merely temporary palliative of surface treatment of oil, etc., and penetration method partially covering the stone with oil residues (so-called asphalts) and tars. Not until the present year of 1912 has the State of New York begun, on a considerable scale, what can be hoped to be reasonably permanent highway construction.

At the 1912 session of the New York State Legislature a bill was passed providing for an additional appropriation of \$50,000,-000 for construction of additional State Highways which are not included in this map. This appropriation submitted to the voters of the State at election on November 5th, 1912, was ratified by a majority of 350,000 of the voters of the State, thus establishing the full approval of the State of New York of expenditure for high grade road construction on a large scale. This bill does not include roads throughout the State built by County or Village municipalities without State aid.

The following is quoted from a statement of the New York State Automobile Association published in several daily papers on October 8, 1912:

"New York, as the wealthiest and most populous state in the Union, is entitled to stand at the head of the list of good roads states. In the past three years it has built more hard surfaced roads than any other two states. In addition to the hard roads, it has so organized its system of town roads and maintenance that 40,000 miles out of the 67,000 miles of such roads have been graded, shaped, drained, ditched, put in good order, and generally made passable for all sorts of traffic, to the great benefit of the farmers and gardeners and dairymen throughout the State, and to the added pleasure and convenience of those who use motor cars.

"It must be taken into consideration in this connection that New York State, with 80,000 miles of roads, has about 86,000 automobiles, or more than one for each mile of road. Naturally the travel is heavy and growing constantly heavier. Roads must be so constructed that they will stand up under the traffic which, means, in plain language, that the State roads especially must be of the very highest type of construction.

"And such construction, with the best drainage, the best foundation, the highest grade of materials and the most expert workmanship, costs money.

"With the \$50,000,000 which the people are to vote on at the coming election, New York State will be able to complete its system of roads. These roads, when finished, will cause New York to compare favorably so far as the excellence and comparative extent of its improved highways are concerned, with any of the countries of Europe whose highways have so long been quoted to Americans as examples."

The New York State Highway Commission, as organized under the laws of 1911, consists of the State Highway Commissioner, as chairman of the Commission, who devotes his entire time to the State Highway Department, the Superintendent of Public Works, and the State Engineer, as ex-officio members of

the Commission. C. Gordon Reel, State Highway Commissioner, resides in Kingston, N. Y., was for many years connected with the highway system of that city. He first entered the Highway Department as first Deputy State Highway Commissioner, and on the death of William D. Catlin, October 5, 1911, then State High-



C. GORDON REEL, C. E. NEW YORK STATE HIGHWAY COMMISSION.

way Commissioner, Mr. Reel was appointed by Governor Dix to fill the vacancy. The present ex-officio members of the State Highway Commission are:

Hon. Duncan W. Peck, of Syracuse, State Superintendent of Public Works.

Hon. John A. Bensel, State Engineer.

The experience of the great State of New York is here outlined because other communities, taking up Highway Improvement, even at this time are not profiting by the experience of others, but are going through the same inadequate, in reality wasteful methods of trying to build roads by cheap constructions which are utterly inadequate to carry the traffic to which



JOHN S. GILLESPIE, ROAD COMMISSIONER, ALLEGHENY COUNTY, PENNSYLVANIA.

they will be subjected, and are thus preparing to learn by their own experience instead of profiting by the costly experience of New York and other states. For instance, at the present time a movement is strongly on foot to build a road from Richmond, Va., to Washington, D. C., by State and National aid and private subscription. A great deal of highly commendable public spirit is being engendered, but the amount being considered for the

building of the roadway is scarcely more than the amount necessary to provide the cheapest form of construction which, under the extremely heavy automobile traffic to which the road will be subjected, cannot adequately carry that traffic without rapid deterioration.

The sooner the officials and taxpaying public begin to realize that the modern automobile subjects the narrow country highway thoroughfare to as great and, on account of narrow width, greater speed and concentration of traffic, often more severe traffic per foot of width than most city streets, the sooner they will take advantage of the greater experience of other communities and discard, as not economical, forms of construction which have already been generally discarded in city pavement construction.

Among the counties which have early developed and continuously maintained high-grade road construction entirely with their own funds and credit, and without State aid, Allegheny County, Pennsylvania, stands in the lead.

Mr. Gillespie outlines the Road Development in Allegheny County as follows:

#### FINANCIAL SYSTEM.

"Highway improvement in Allegheny County commenced in 1897, this having been started as the result of the Flinn Act, which was passed by the Pennsylvania Legislature on June 26th, 1895. Under this act the County was authorized to issue a certain per cent. of the assessed valuation of the entire County which practically amounted to \$12,000,000. On May 11th, 1911, a new road act was approved, which gives the County the authority to issue bonds amounting to two per cent. of the assessed valuation—this new amount is practically \$22,000,000. To date the County has issued about half this amount. The County Commissioners, after organizing the Road Department, commenced issuing bonds at the rate of \$1,000,000 per year. In connection with this bond issue, the Commissioners levy a 'road tax' of one-half mill on the assessed valuation. This nets the County close on to \$600,000 per year. This cares for maintenance and the consequent sinking fund charges on the bonds."

#### RESULTS.

"In our County to-day we have practically 450 miles of improved roads; this includes waterbound macadam, brick, Warrenite, asphaltic penetration and approximately 28 miles of plank roads. (These plank roads were purchased by reason of State Legislation, and we have only been maintaining portions as such, replacing as much as possible each year with modern construction.) Our County contains 1,741 miles of public road, and we are completing practically 50 to 60 miles per year."

## MAINTENANCE.

"In our maintenance branch we care for the same by a 'patrol system'; each of our roads is manned by 'caretakers,' whose duty it is to see that the road is free from all loose stone, in good shape at all times, the ditches and sewers always open. All the concrete, or stone, sewer heads, watering troughs, dangerous spots, are caused to be whitewashed, so as to show the traveling public necessary constructions of this character. This is one of the features I caused to be adopted when I took charge of the department.

"I claim to be one of the first to condemn macadam as insufficient to sustain heavy automobile traffic. For five years I have been preaching against the same. My motto is 'build a road right, never mind the cost. The people will forget the cost but will never forget what the road looks like.' When you purchase something 'cheap' you pay for just that much. You cannot expect the same results from something more expensive. That is the way I feel about macadam. Prior to my connection with this County I was Assistant Superintendent of Highways and Sewers for the City of Pittsburgh, for seven years. You can see I have always been a 'good roads man.' I love to build a good road, to walk on it, and to talk about it. It is my hobby."

From 1898 to 1905 inclusive, Mr. Gillespie was Assistant Superintendent of the Highway and Sewer Department of the City of Pittsburgh, and early in 1906 was placed in charge of the Road Maintenance Department of Allegheny County and continued in that position until Mr. Samuel D. Foster, the Road Engineer of the County was appointed Chief Engineer of the Pennsylvania State Highway Department when Mr. Gillespie was put in full charge as "Road Commissioner" of the county.

Messrs. Gillespie and Foster are together chiefly entitled to credit for the present high state of efficiency and maintenance of the Allegheny County road system.

Doubtless some roads to-day carry no more severe traffic than many of the roads of ten years ago on which macadam proved to be sufficient and economical, but the fact remains that the severity of the traffic caused by automobiles and the increase of automobile traffic is such that, what can to-day be classed as a "light traffic" road for which water-bound macadam would suffice, may in two or three years be a heavily traveled automobile highway. This statement is justified when we reflect that only twelve years ago automobiles were nearly as scarce as aeroplanes are to-day. And yet communities which are now, for the first time, taking up country road construction are preparing, through cheap construction, to go through the expensive experience of New York

State as outlined above, which is typical of the experience of many states. When building expensive roads, at this time, it is well to go to sufficient expense so that the road when constructed will stand the ravages of modern automobile traffic (even if not subjected to such traffic now) and which will be sufficiently more durable to warrant the expense, even if the automobile traffic, making such improved construction a necessity, does not immediately develop.

When the officials and taxpaying public profit by the mistakes of too little expenditure for cheap forms of construction of other communities, then the general practice, regardless of initial cost, will be the construction of the best road procurable and the way to raise the necessary funds will be found without unduly taxing the public, including the automobile men, who contribute over ninety per cent. to the wear to which the country roads are subjected. As proof that this is not an extravagant financial statement, it is only necessary to consider the many, many millions which the public expends in useless extravagance without even feeling the loss. A recent issue of the New York Sun is authority for the statement that the United States expends in chewing gum the sum of \$25,000,000 annually, only a few cents per capita, but enough to each year build the best public highway procurable, 16 feet wide for a distance equal to that from New York to Chicago.

Of the many proposals suggesting highways improvements the broadest in its scope is the 50,000 miles of Highways proposed by the National Highways Association. This Association was organized for the purpose of:

First: Urging the investigation by a government commission of the entire road question in its relation to the Federal government.

Second: Aiding such commission by data already obtained in every way to arrive at a satisfactory and permanent solution of this great question.

Third: The stimulating of interest in the building and maintaining of good roads everywhere.

While the work of this Association is just beginning and its program is of the proportions necessarily requiring time for fulfill-

ment it has the financial backing and earnest co-operation of men of such high standing with no other interest than that of the public good, that I am warranted in predicting that National Highways Association will ultimately achieve its chief aim even though changed in the details of the present plan. The map of the association shows a system of Highway development very carefully planned, the routing of which has met with the endorsement of many of the State Highway Engineers. This system of proposed roads connects not only every state with every other state, but the capitals of every state. The main divisions of the roads are as follows:

MAIN HIGHWAYS:	Miles.
1. NORTHERN, Boston-Seattle .....	3,875
2. CENTRAL, Washington-San Francisco.....	4,025
3. SOUTHERN, St. Augustine-San Diégo.....	3,375
<hr/>	
TOTAL MAINS EAST AND WEST.....	11,275
4. ATLANTIC, Calais, Me.-Miami, Fla.....	2,400
5. MISSISSIPPI, Duluth-New Orleans.....	1,450
6. PACIFIC, Seattle-San Diego.....	1,775
<hr/>	
Total. .....	5,625
Grand total, North East, South, West.....	16,900 miles.

In addition to the above, truck highways are proposed in the several sections, aggregating 23,300 miles and to completely tie up the system, 40 link highways, aggregating 10,825 miles.

Congressman Warburton of Tacoma, Wash., has recently published the substance of a bill he proposes sending to the present session of Congress, which is not materially different from the plan of the National Highways Association, but goes further in providing a scheme for raising the funds necessary for such improvements. The essential features of Congressman Warburton's scheme are as follows:

1. Connect all the State Capitols by a series of national roads, nationally built and maintained.

2. Estimate the cost at \$20,000 to \$25,000 per mile, which is really the requirement for adequately high class construction.

3. Increase the tax on tobacco to the rate from which it was reduced in 1879.

He estimates that this increase will yield about \$80,000,000 per annum and enable the completion of such a system of national highways in a very few years.

He also points out that when the tax was reduced the reduction in cost of tobacco to the consumer was not appreciated, and resumption of the tax at this time would not be felt by the consumer if indeed the actual cost to the consumer is increased.

#### NATIONAL HIGHWAYS VS. NATIONAL HIGHWAY AID.

It is well to here call attention specifically to the difference between national highway construction (as proposed by the National Highways Association) and national aid to highway construction.

Most, if not all states which have tried the state aid, have found it to be practically unworkable, not only because of the dual means of raising funds jointly through the states and counties and sometimes municipalities and individual assessments, but also because of the conflict of management between the several organizations of the government, consequently New York and other states which originally tried the state aid in highway construction have since turned to state highway construction, without the assistance of county, city, or village finance or authority. In New York State, however, if the State Highway Commission orders the construction of a road of a given width or quality through a village or city and the village or city authorities desire a wider or more expensive road and so petition the State Highway Commission and provide the additional funds for such wider or more expensive improvement, then the State Highway Commission is required by law to construct the road of such material and width as the village or city authorities may so provide.

It is believed that the same principle will work out most advantageously in connection with national highway improvement,

as it has been proved to be the most satisfactory in connection with State highway improvement; that is, whatever the federal government does should be along the line of its constructing and maintaining certain work designated as national highways in the several states through federal organization with federal funds.

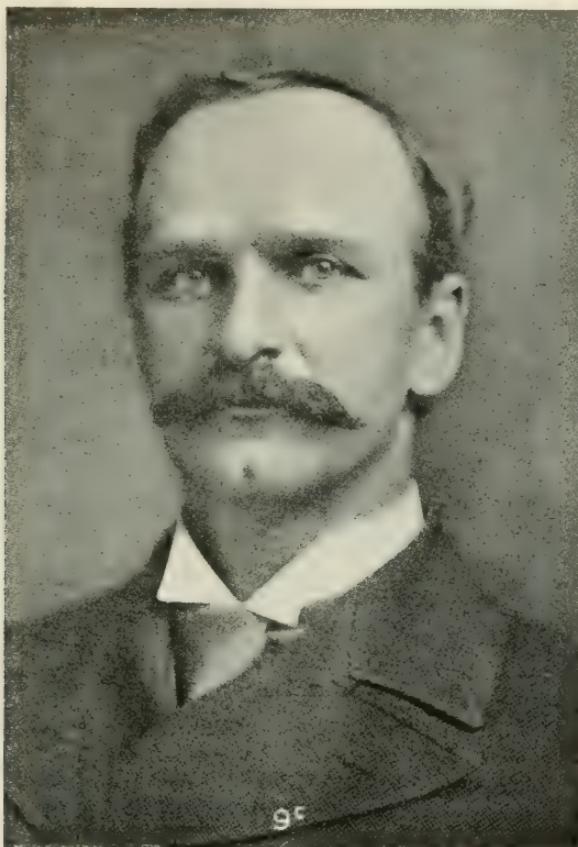


CHARLES HENRY DAVIS, PRESIDENT PRO TEM NATIONAL HIGHWAYS ASSOCIATION.

To Mr. Charles Henry Davis of South Yarmouth, Mass., belongs the credit of the conception of this great project. He has and is still giving freely of his time and money to the work. Mr. Davis was born in Montgomery County, Pa., on May 4th, 1865. Aside from his interest in the National Highway Associa-

tion he is actively engaged in more local plans for highway development.

Second to Mr. Davis, General T. Coleman duPont, President of the duPont Powder Company of Wilmington, Del., is perhaps the most active of the men who are actively associated with the



GENERAL T. COLEMAN DUPONT, OF WILMINGTON, DEL.

National Highways Association. General duPont was born at Louisville, Ky., on December 11, 1863, is a graduate of Massachusetts Institute of Technology, for the improvement of the buildings of which he has recently contributed \$500,000, and since his graduation has devoted his time to mining, steel, street

railway, railroad and other engineering enterprises and to the business of the duPont Powder Company. Although the active head of a business organization which would overtax the energy and ability of most men of more than ordinary business genius, General duPont is not only interested in the development of national highways, but, as is generally known, he has contracted with the State of Delaware to secure the right of way two hundred feet wide and at his own expense build and present to the State an improved highway over 100 miles in length at a cost guaranteed to aggregate not less than \$2,000,000, extending from the northern end of the State to Selbyville, the southern Delaware-Maryland boundary line. Unfortunately, legal difficulties in connection with the securing of rights of way have arisen in opposition to the duPont Delaware Road, and although actual construction was well under way and contracts for the building of the entire highway about consummated and an efficient engineering organization developed, the completion of the duPont Road through the State of Delaware is at least temporarily enjoined by the courts. It is understood the improvement must now await decision of the Supreme Court of the United States, to which appeal has been taken from the decision of the Supreme Court of the State of Delaware, which decided against the plaintiff taxpayer, who claimed the Act of the Delaware Legislature, permitting General duPont to present this magnificent road to the State and incidentally encourage highway development throughout the United States, to be unconstitutional.

At a recent meeting of automobile manufacturers held at Indianapolis, Ind., it was proposed to build a transcontinental road from New York to San Francisco, entirely at the expense of the automobile builders and users, and funds are now being raised by a committee, from whose publication the following is extracted:

"The plan is to create a fund by subscription from motor car and accessory manufacturers and dealers, each subscription to equal one per cent. of the gross earnings of the subscriber. These subscriptions will be divided into three or five annual payments, as decided by a national committee to be elected later by the subscribers. The automobile industry is well able to build this road and present it to the automobile users of the United States.

"Handled as a private enterprise by the leading men in the automobile industry, in the same way they handle their other business affairs,

this road can be honestly, substantially built, and completed by May 1st, 1915, so that we will have a perfect automobile highway over which thousands will tour to the Panama Canal Exposition in San Francisco in May or June, 1915."

When the plan was suggested at the Indianapolis Convention, \$300,000 was subscribed in a few minutes. Since then the canvass for funds is being actively prosecuted, and one company interested in the manufacture of automobile tires is reported to have alone contributed \$300,000. A fundamental error in the



WATER-BOUND MACADAM HIGHWAY, DAVIDSON COUNTY, TENN.

plan is that the \$10,000,000 proposed is the one heretofore referred to as a general error of estimates for road construction, which amount is approximately one-tenth the amount necessary to build a road of the high character required to adequately maintain the traffic to which such a road will be subjected, as has been proved by the experience of New York, Pennsylvania and other States referred to. The organization and individuals back of the plan, however, are such as to, and they have the financial ability to, bring such plan to a successful end.

All of the foregoing broad plans for first-class highway development on a large scale show a public awakening to the importance of the matter which even ten years ago the most enthusiastic good roads dreamer would not have thought possible.

It is believed that typical illustrations of some of the errors of bituminous road construction which have been attractive because of low first cost, but which have proved unsuitable to meet the heavy automobile traffic, may be useful.

The foregoing is a photograph of water-bound macadam country highway in Davidson County, outside of the City of



MACADAM ROAD SURFACE TREATED WITH OIL RESIDUUM  
(SO-CALLED ASPHALT).

Nashville, Tenn., and illustrates the ravelling, rutting effect of automobile traffic on country highways.

This is a photograph of a macadam road surface treated with oil residuum (so-called asphalt), the photograph being taken shortly after a rain which left water standing in puddles from one inch to six inches deep in ravelled portions of the oiled surface.



EXAMPLES OF PENETRATION METHOD ASPHALT MACADAM, LAID IN 1909 IN HUNTINGTON AVENUE, BOSTON, MASS.

These photographs are of a penetration method asphaltic macadam, laid in 1909 on Huntington Avenue in the Back Bay District of Boston, the work being done by the most improved methods, using a high grade asphalt, and the greatest care was practiced in the construction. This type of construction is necessarily subject to the following inherent weaknesses:

- a. Impossibility of getting the voids between the particles of stone either fully or equally filled with the bituminous material.
- b. The individual spaces or voids between the particles of stone, in order to be large enough to permit the asphalt to flow into the spaces, are necessarily so large that if the spaces are approximately filled the pure bitumen is practically in large lumps between the particles of stone, causing the road to "bleed" and "roll" in summer, and consequently the particles of stone are not properly bonded together.
- c. From the above comes an unsightly, undesirable road, if subjected to any considerable amount of traffic.



HUNTINGTON AVENUE, BOSTON, MASS.

This is a photograph of a section of Huntington Avenue adjoining that in the previous photograph and laid under the same methods and care, but using cement prepared from coal tar. The results are practically the same except that in the section in which the coal tar material was used the bitumen is practically all gone and consequently the road is ravelling to a greater extent.

Below is a photograph of a tar macadam road by penetration method in the Larchmont district outside of Norfolk, Va., which the writer saw within a few weeks after its completion in the Fall of 1910, when it had the *surface appearance* of as fine a road as could be built. It looked well for over a year, but, although not a thoroughfare and but lightly travelled, is now in very bad condition throughout its length.

Mr. Walter Taylor, Jr., Assistant City Engineer of Norfolk, Va., writes, "A water bound macadam in or near a city is unwise and a mistake where subject to automobile traffic. It is



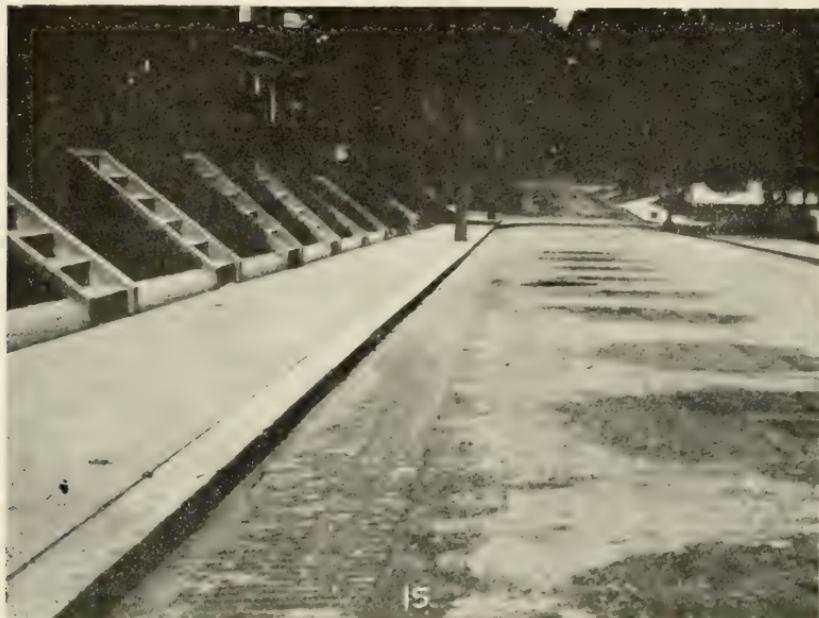
TAR MACADAM (PENETRATION METHOD) NEAR NORFOLK, VA.  
LAID 1910. PHOTO TAKEN JULY, 1912.

poor practise to lay cheap pavements which will not last one-half the time that the more expensive ones will last."

In the year 1909 Mr. Logan Waller Page, Director of Public Roads, U. S. Agricultural Department, conceived and patented the idea of making roadways by a mixed combination of Portland cement concrete and oil. Samples were laid in Washington, D. C., and Richmond Borough (Staten Island), New York, in the year 1910. The following photograph, taken July 15, 1912, of Meridian Street, Washington, near 16th Street, is typical and

fairly representative of all of this class of construction of which the speaker has been able to learn.

In the year 1911 the Director of Public Roads arranged for the laying of sections aggregating about one mile of the Chevy Chase Road, which extends from Washington, D. C., to Chevy Chase, Md. The road was divided into twelve sections, and, while varying in some details, which are carefully recorded and



PORLAND CEMENT OIL CONCRETE ROAD, MERIDIAN STREET,  
WASHINGTON, D. C. LAID 1910. PHOTO TAKEN  
JULY 15, 1912.

shown by "markers" at the side of the road, and, while several grades and makes of bituminous materials were used, they were all of the same typical construction, to wit: penetration method of bituminous macadam, using crushed stone spread in layers of varying sizes and successively poured with a total of approximately two and one-half ( $2\frac{1}{2}$ ) gallons of bitumen per square yard. When the speaker examined this work in May, 1912, about eight (8) months after its completion, he found portions of

the work then undergoing repairs—some sections to the extent of fully fifty per cent. of the entire area. Other portions were already ravelling; but in general the surface was in varying degrees of soft, nasty, undesirable condition. In some sections the general condition of surface was soft and sticky with bitumen over half an inch thick, while in the same sections other portions of the surface were so poor in bitumen as to be ravelling. Being laid as a sample, with not only the constant advice and



ASPHALT MACADAM, "OPEN" MINED METHOD, GARDEN CITY,  
LONG ISLAND, N. Y. LAID 1911. PHOTO TAKEN  
SEPTEMBER, 1912.

supervision of the office of Public Roads, but also of that of the people supplying the bituminous materials, this work was doubtless done as well and thoroughly as work of this class could be done.

The foregoing is a photograph of a type of bituminous macadam mixed method which is largely used, but would not be used except that it is cheap, and when not subjected to any considerable volume of traffic looks well for a time. This photo-

graph is of construction in Garden City, L. I., on Hempstead Turnpike Road, and shows its generally unsatisfactory condition after two years' use under ordinary country road conditions.

Below is a photograph of a sawed vertical cross section of the two-inch wearing surface of open bituminous mixed road surface laid under specifications the same as the foregoing, consisting of:

- a. Heated crushed stone varying in size from three-eighths ( $\frac{3}{8}$ ") inch to one and one-fourth ( $1\frac{1}{4}$ ") inches, and consequently carrying about forty per cent. of voids, many of them as large as one-half ( $\frac{1}{2}$ ") inch in largest dimension.
- b. Separately heated asphaltic cement mixed with the stone in the proportions of sixteen (16) gallons asphalt per cubic yard of stone.



SAWED VERTICAL CROSS SECTION OF ASPHALT MACADAM "OPEN" MIXED METHOD LAID IN NAHANT, MASS., JUNE, 1912.

When taken from the road the mixture was so inherently weak that it would not hold together, and the sawed section was procured by reheating and thoroughly tamping into a strong box and, without removing the material from the box, sawing it with a "diamond" saw.

The asphalt, as used and the quantity specified, is only sufficient to coat the particles of stone—not at all filling the voids as is shown by the photograph. The dark portions of the photograph are the voids surrounded by walls of asphalt-coated stone and the light portions are planes made by saw cuts through the individual pieces of stone.

All of the foregoing photographs are typical of the several forms of inferior, cheap constructions referred to, and are fairly representative. In fact, it is believed that there is no section of road of any of the types referred to in practical use anywhere which has been in use for three years or, generally speaking, even



FREDERICK JOHN WARREN, BORN FEBRUARY 18, 1866.  
DIED FEBRUARY 21, 1905.

two years, and subjected to as heavy traffic as that of the ordinary automobile highway, which is not in substantially the condition shown by these typical illustrations.

Early in the year 1899, with the groundwork of over fifteen years of close application to the business of handling and refining bituminous materials and the construction of asphalt pavements,

the late Frederick John Warren conceived the idea that a roadway wearing surface, superior to anything then devised, could be made of a mixture of bituminous materials and crushed stone, varying in sizes from a maximum size which may be as large as one and one-half to two inches, depending on the proposed depth of wearing surface, down to a minimum size of impalpable powder, the varying sizes being carefully and accurately proportioned so that each succeeding size of particles of aggregate would be in such proportion as to fill the spaces between the coarser particles and so on down to the finest powder, thus providing a compact structure of crushed stone which, irrespective of the bitum-



PARK PLACE, PAWTUCKET, R. I., BITULITHIC PAVEMENT.

inous material, would have a high degree of inherent stability and the lowest practicable percentage of voids. With that basic idea it took nearly two years' close laboratory study and thought to work out the details, including the devising of the necessary plant, before he was ready to present to the public the new construction which was subsequently christened "BITULITHIC," derived from the Greek word "lithos"—"stone," and the Latin word "Bitumen."

Pawtucket, R. I., was the first city to adopt Bitulithic, and Park Place, on a comparatively flat grade, was laid in May, 1901.

The Bitulithic surface was laid to a thickness of only one and one-half (1½") inches, using a maximum sized stone about three-fourths (3/4") inch, over an old tar concrete roadway to which it formed a perfect adhesion.

Immediately following the completion of Park Place, the new pavement was laid on Harvey Street, having extremely steep grades, varying in the several blocks from 4.9 per cent. to 12 per cent.



HARVEY STREET, BITULITHIC, PAWTUCKET, R. I.

Harvey Street produced the proof of a new accomplishment in bituminous pavement construction, to wit: that it is possible to lay a bituminous roadway on steep grades which will be safe to horses and at the same time prevent the washing out in times of heavy storms, with which officials are so discouragingly familiar in communities which have roads on steep grades.

The Park Place and Harvey Street pavements stand today, after eleven years' use, with no repairs required, as a monu-

mental proof of the efficiency of Fred J. Warren's basic idea, and its practical application.

This sawed cross section clearly shows the density and stability of the construction of the Bitulithic pavement and how the receding sizes of mineral are so proportioned as to fill the



VERTICAL SAWED CROSS SECTION OF BITULITHIC PAVEMENT, DARTMOUTH STREET, BOSTON, ALONGSIDE THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY. PAVEMENT LAID IN 1903. SAMPLE TAKEN FROM SEWER CUT, 1911, AFTER EIGHT YEARS' USE.

spaces in the aggregate so that when heated and mixed with bituminous material of the proper grade, and spread and rolled on the base, the whole becomes practically a monolithic sheet of resilient rock, with sufficiently rough surface to provide a superior foothold.

The success of Bitulithic is best illustrated by the fact that in eleven years it has been laid to an extent equal to 1,249 miles of roadway 30 feet wide, in over 200 cities of the United States and Canada, including all variations of traffic and climatic conditions from Edmonton, Alberta, Canada, to El Paso, Texas.

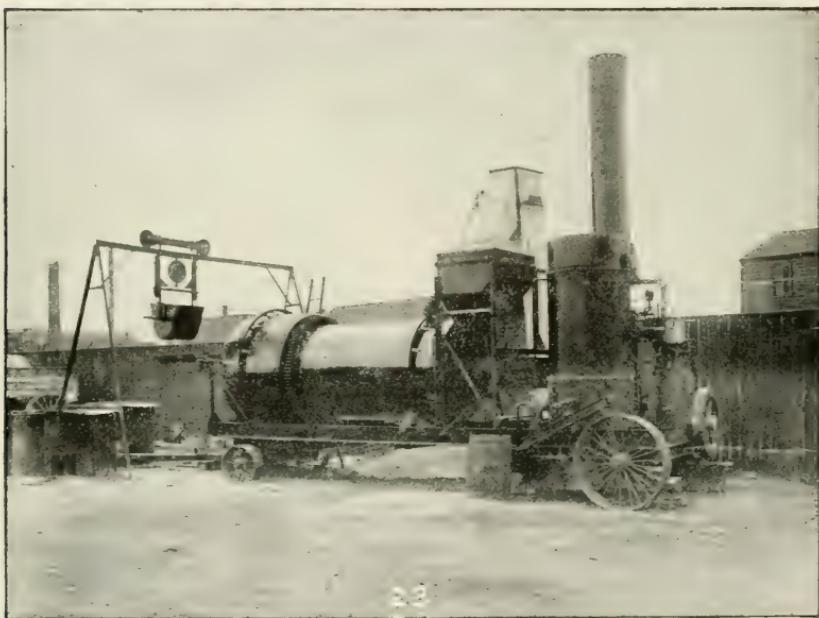
Now, after eleven years practical successful use, experts generally regard this construction as the best form of bituminous pavement for both city streets and country roads.



FIRST WARRENITE ROAD, STATE STREET, NASHVILLE, TENN.  
LAID 1905. PHOTO TAKEN JULY, 1912.

In the year 1905 it became evident that, ere long, with the advent and rapid increase of automobile traffic, the time was not far distant when the country road would be subjected to nearly as severe usage and require improved construction similar to city streets, but with some modifications of detail to meet the country road conditions. Consequently, in October, 1905, such a modification of the Bitulithic principles called "WARRENITE" was devised to meet the rapidly developing country road conditions, and was laid on State Street in the Suburbs of Nashville, Tenn.

The application of the principles of the Bitulithic pavement to country road conditions required a great deal of study and experimentation, not only to produce a plant which is sufficiently portable to be available for country road work located a long distance from railroads and sources of material supply, but also to modify the construction so as to make it economically available for country road conditions. Beginning in 1908 with this development, in the spring of 1910 the "WARRENITE" ROAD was ready to present to the public, and since that time the *Development*



WARRENITE ROAD PORTABLE HEATING AND MIXING PLANT.

*ment of Warrenite Road* is best shown by the fact that in 1910 in the States of Pennsylvania, New Jersey, Washington and in British Columbia, Canada, it was adopted to the extent of 37,338 square yards. In 1911 California, Pennsylvania, New Jersey, British Columbia, New York, Delaware and Washington laid 432,424 square yards. The construction proved so successful that in 1912, to November 30th, California, Pennsylvania, British Columbia, Delaware, Manitoba, Territory of Hawaii, New Jersey, Ohio, Washington, Connecticut, New York, North Carolina,

Rhode Island, Washington, Oregon, have contracted for 1,148,795 square yards, making a total of Warrenite Road in the three years ending November 30, 1912, of 1,618,557 square yards, equal to 172 miles of sixteen foot roadway.

The first county to adopt Warrenite Road to more than a trial extent was Allegheny County, Pa., which contracted for its use to the extent of one (1) mile in the year 1910. The road, carrying a heavy auto traffic, is now two years old, has required



WARRENITE ROAD, STEUBENVILLE PIKE, ALLEGHENY COUNTY.  
LAID 1910.

no repairs, and is in perfect condition. Allegheny County has extended its mileage of Warrenite as follows:

1911 .....	15 miles
1912, to November 30.....	27.9 miles

The State of Washington closely followed Allegheny County by the adoption of Warrenite in 1910, and it has since been laid and contracted for in that State to the extent of over 21.3 miles.

Below is a photograph of a typical representation of the Warrenite Country Road in King County, Washington, illustrating the physical difficulties which have to be overcome in that mountainous section, and showing the beauty of the scenery.

One of the most progressive and rapidly developing sections of America is Western British Columbia, centering at Vancouver.

The next photograph, taken July, 1912, is of a Warrenite Road 3.3 miles long under construction in Point Grey, B. C., extending a Warrenite Road approximately 6 miles, laid in 1910



PACIFIC HIGHWAY, WARRENITE, KING COUNTY, WASHINGTON.  
LAID 1911.

and 1911, and shows the completed road in the background; the unrolled macadam foundation in the foreground, and the rolled macadam foundation between. This construction illustrates two points of special interest.

First.—The progress of constructing high-class roads and residences before time has elapsed to allow the removal of the stumpage from the forests of yesterday. This is a feature of North Pacific Coast development which makes us of the East open our eyes in amazement.

Second.—The fact that this road is being constructed more than six miles from the mixing plant, by the hot mixture being delivered by motor trucks at a cost and loss of temperature no greater than would be with horse-drawn trucks a distance of one and one-half to two miles.

The motor truck makes it possible to economically construct roads of hot bituminous stone mixture three times as far from the mixing plant as would be economical with horse-drawn trucks. This means more concentration and less plant units and consequent reduction of expense of operation and equipment, and is a marked progress in country road construction.

British Columbia first adopted Warrenite in 1910 in contracting for 5.2 miles on Marine Drive, leading out from Vancouver.

This photograph shows an extreme flood which occurred November 19-23, 1911, on Pacific Highway, between the towns of



WARRENITE ROAD, POINT GREY MUNICIPALITY, B. C.

Orilla and Kent in the State of Washington, the Warrenite road being under water for a period of ninety-six hours. (Page 54.)

This photograph is of the same location as the previous photograph, taken November 25, 1911, immediately after the flood had subsided. Note that the Warrenite Road perfectly withstood this extreme test, while the macadam shoulders outside the Warrenite surface are badly washed. (Page 54.)

All the Warrenite Roads above referred to have been laid on macadam foundation, either resurfacing old macadam or using new macadam partially filled and bound with stone, but not



FLOOD, WARRENITE ROAD, NOVEMBER 19-23, 1911, PACIFIC HIGHWAY,  
KING COUNTY, WASHINGTON.

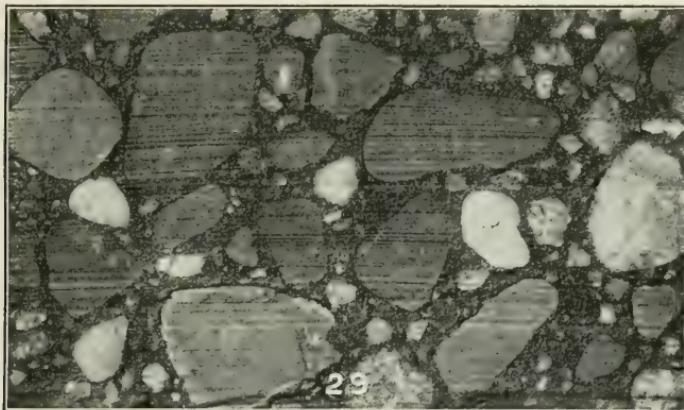
as fully filled as would be the best practice for the wearing surface of a water-bound macadam. Such macadam foundation thus provides both a drainage course to the pavement and also a solid foundation.



SAME LOCATION AFTER FLOOD HAD SUBSIDED.

The use of gravel in place of broken stone where gravel of proper size and quality is available is an economy in Bitulithic and Warrenite construction. This photograph is of a road laid in Dorchester County, near Cambridge, Md., in the Spring of 1911.

Along the Atlantic and Gulf Coast, from Maryland to Texas, oyster shells are found in large quantities and are generally used for road building. They provide a road of pleasing appearance, great economic value and considerably less cost, compared with high cost of stone, which is generally scarce along the Southern coasts, but the oyster shells are so soft that they wear rapidly and

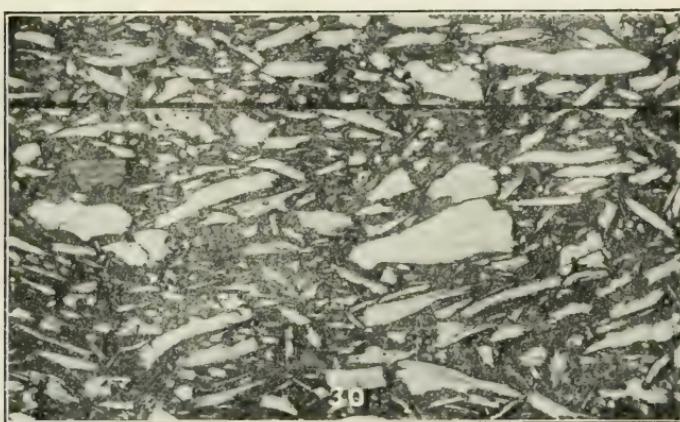


SAWED CROSS SECTION GRAVEL WARRENITE ROAD, DORCHESTER COUNTY, NEAR CAMBRIDGE, MARYLAND.

become extremely dusty, especially under auto traffic. By successful trial in Dorchester County, Md., in June, 1911, it has been proved that an extremely successful Warrenite Road can be made, using crushed oyster shells instead of stone. One section of the road was made re-using the metal on the old oyster-shell road. About two inches of the surface of the old shell road was removed by picks in the roller wheels, and shovels, and the surface then brought to an even contour and rolled. The excavated broken shells were then screened to control the proportions of the various sizes and recombined in the proper proportions with a small proportion of sand and heated and mixed with Warrenite bitumen

and spread and rolled as is the common practice in laying Warrenite surfaces made of crushed stone mixtures. The flushcoat bitumen and the bitumen surrounding the particles of shell protect them from abrasion, and after a year's use no wear is perceptible. This is destined to be a great economy, both for new construction of roads at points along the coast where oyster shells are economically available and for reconstruction of old oyster shell roads.

In the year 1908 Mr. E. C. Wallace of Auburn, Cal., invented a method of construction of bituminous mixed roads which is destined to fill the demand for a construction compara-



SAWED CROSS SECTION OYSTER SHELL WARRENITE ROAD,  
DORCHESTER COUNTY, NEAR CAMBRIDGE, MARYLAND.

tively cheap in cost and far superior to the penetration method and open mixture work referred to in the early part of this paper. The first work of this kind, except experimental sections, is shown by this photograph of Cove Street, New Bedford, Mass., laid in 1910. The load of cotton, eight tons, shown in the photograph (page 57), is typical of the traffic in this cotton manufacturing centre. The construction on Cove Street is now two years old and in perfect condition, and so satisfactory that it has been adopted for resurfacing the asphalt roadway on the New Bedford-Fairhaven Bridge, and it has been adopted on roads in Westfield and Springfield, Mass.

The Endurite Road surface is laid on any suitable foundation—concrete, macadam, etc. The method of construction is best illustrated by this photograph showing sawed vertical cross section of the Endurite surface, which is laid in two layers. The first layer is of a graded mixture of crushed stone or gravel, using enough fine material to bond the particles together after they are coated with asphalt, but not enough to entirely fill the voids, and consequently a considerable amount of labor and material is saved. This course is mixed and spread hot to a depth of

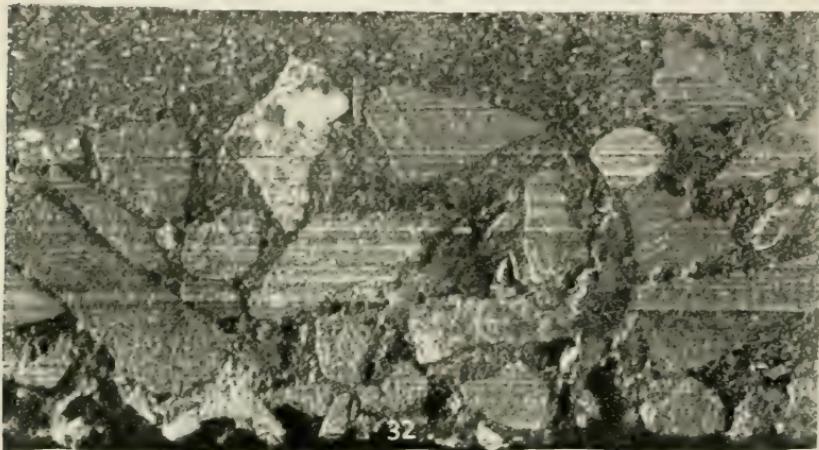


ENDURITE ROAD, COVE STREET, NEW BEDFORD, MASS. LAID 1910.  
(SHOWING 8-TON LOAD OF COTTON.)

about two (2) inches and *immediately after spreading and before rolling this course*, there is spread over it about one-half ( $\frac{1}{2}$ ) inch of coarse asphalt pavement mixture. *The two courses are then rolled and thus compressed together*, with the result that the finer upper course mixture becomes compressed into and thoroughly blended with the coarser mixture below to a depth of about one (1) inch. The result, therefore, is a thoroughly blended two (2) inch surface, the upper half of which is a close, compact, dense, waterproof combination of mineral aggregate and asphalt,

and the lower half a slightly porous, but still stable asphaltic concrete.

Dr. Joseph Hays Amies, of Philadelphia, after a long study, finally developed in 1909 an interesting form of road construction named "Amiesite." This construction is made of a dense mixture of varying sizes of crushed stone and bituminous materials laid on macadam or broken stone foundation. The eminently distinctive feature of Amiesite is that it is mixed cold, that is, the soft bitumen in heated condition is mixed with the crushed stone and laid at the temperature of the air. The mixing plants are generally located in and as an adjunct to large quarry plants, and



CROSS SECTION OF ENDURITE ROAD SURFACE.

so arranged that the materials are handled mechanically by most economical means. A portion of the mineral aggregate is damp sand and quick lime, the chemical action of which is designed to harden the asphalt. By this, the cold mixture method, the surface mixture combination of crushed stone, lime, sand and asphalt is loaded on cars and may be shipped hundreds of miles; unloaded at destination; hauled to the street; spread and rolled on the prepared foundation without heating. Naturally, a roadway laid in this manner will not be as firm, and therefore not withstand hard usage as well as a more solid combination of harder bituminous cement and stone, but such a mixture can be laid at

materially lower cost, and Amiesite serves a useful purpose where there is a demand for a comparatively low cost roadway for light traffic conditions and in locations long distant from available plant location and in areas too small to warrant the local installation of a high grade mixing and heating plant.



AMIESITE ROAD, NEWPORTVILLE, N. J.

Amiesite mixing plants are now installed in large stone crushing plants as follows:

Lambertville Stone Quarry Co.,  
North Jersey Quarry Co.,  
North Jersey Quarry Co.,  
North Jersey Quarry Co.,  
Commonwealth Quarry Co.,  
Francisco Brothers,  
General Crushed Stone Co.,  
General Crushed Stone Co.,  
General Crushed Stone Co.,  
General Crushed Stone Co.,  
H. G. Hinkle, Inc.,  
Booth & Flinn,  
Lane & Co.,  
C. T. Eastburn.

Lambertville, N. J.  
Bound Brook, N. J.  
Millington, N. J.  
Snake Hill, N. J.  
Great Notch, N. J.  
Springfield, N. J.  
Akron, N. Y.  
Rock Hill, Pa.  
Glen Mills, Pa.  
Wilkes-Barre, Pa.  
El Dorado, Pa.  
Blairsville-Intersection, Pa.  
Middlefield, Conn.  
Long Island City, N. Y.

During the past twenty-five years periodical and generally unsuccessful efforts have been made to utilize as a roadway wearing surface Portland cement concrete. While useful as a roadway foundation, where required by weak sub-soil condition, Portland cement concrete is undesirable as a roadway surface because of its rigidity and consequent noise, and inability to withstand hard knocks of traffic, especially horse-drawn and steel tired vehicles. The horses' caulks and steel tires cause the rigid, friable concrete to rapidly abrade and wear into ruts and holes.

As a surface for automobile highways the roughness caused by the coarse particles of stone and its rigidity are objectionable, although some districts during the past year have adopted it quite extensively. That recent efforts toward the introduction of Portland cement concrete as a roadway surface are having the same result of dissatisfaction as earlier efforts, is best proven by the fact that those who have urged the claims of Portland cement concrete roadway surfaces laid under one method or another are now all advocating some form of bituminous covering over the Portland cement concrete.

Mr. Logan Waller Page, Director of Public Roads of the United States Agricultural Department, in a report to Congress December 5, 1910, published in January, 1911, issue of "Good Roads," refers to the fact that cement concrete "is extremely porous and absorbs water."

During the past year a good deal has been said in the paving industry about a form of road construction consisting of an ordinary concrete foundation five (5) or six (6) inches in depth coated with either crude coal tar or coal tar with the water distilled off and still-liquid, or oil residue, using about one-fourth (1/4) to one-third (1/3) gallon of the liquid bitumen per square yard, into which sand or crusher screenings are spread. This construction is being advanced by those who have been pressing concrete as a proper wearing surface, but, now that it is realized that hydraulic cement concrete is not a suitable wearing surface, being at once too rigid, noisy and friable, are advocating the tar painting of the concrete surfaces constructed under the several methods.

At a convention of the American Associations of Portland Cement Manufacturers on May 9, 1912, reference was made to this construction as having been reported successful after three years' use in Ithaca, N. Y.

That the reports were erroneous is shown by this photograph of the Ithaca roadway referred to, taken July 14, 1912.

An accurate description of the road is as follows:

"Concrete base made of Portland cement; limestone and sand laid in 1909. Painted with tar in 1910. On July 14th, 1912, the bitumen is en-



TAR PAINTED CONCRETE ROAD, ITHACA, N. Y. CONCRETE LAID 1909.  
TAR PAINTED 1910. PHOTOGRAPH TAKEN JULY 14, 1912.

tirely worn off the center of the road, showing rough concrete. The bitumen is still intact on the sides, but is soft, irregular and can easily be peeled off of the concrete, which is badly cracked and, taken as a whole, is in very poor condition. The roadway is subjected to extremely light traffic."

In the year 1909 Mr. August E. Schutte of Northboro, Mass., invented a novel form of road construction which has developed into the "BITUSTONE DOUBLE BOND" ROADWAY, and which the writer believes to be the only rational roadway yet de-

vised which provides a wearing surface made of a combination of Portland cement concrete and bituminous material. The first practical construction of this type of road was on a factory driveway at Cambridge, Mass., laid in the year 1909. After two years' hard usage, in 1911 the road was and still is in excellent condition without repairs, and in the year 1911 BITUSTONE DOUBLE BOND was laid on Middlesex Road, Chestnut Hill, Newton, Mass., of which this is a photograph, and it has proved so satis-



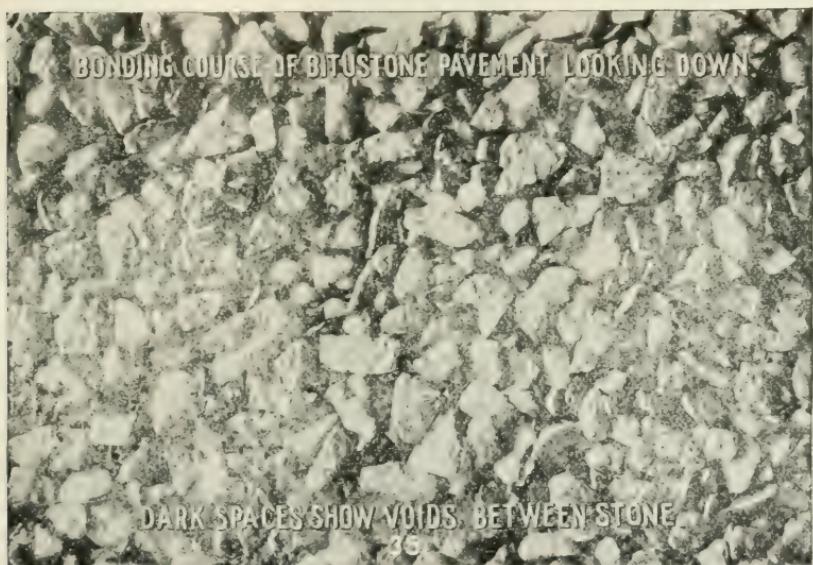
BITUSTONE DOUBLE BOND ROADWAY, MIDDLESEX ROAD, CHESTNUT HILL, NEWTON, MASS.

factory that it is now being extended on the adjoining Dunster Road, and has this year been adopted in Haverhill, Mass., Wichita, Kan., and Helena, Ark.

The construction of BITUSTONE DOUBLE BOND is best explained by this illustration of the "bonding course," and the following illustration of cross section of the completed road.

The first course of Bitustone Double Bond is ordinary concrete, generally laid to a depth of  $3\frac{1}{2}$  inches and made of Port-

land cement, sand, and gravel or crushed stone in the usual proportions of 1, 3 and 6, respectively. After this concrete is thoroughly tamped, but while it is still plastic, there is spread over it the "bonding course" shown by this illustration—looking down on the surface. The "bonding course" is made of *neat cement* and nearly uniform sized crushed stone—passing one (1) inch and remaining on one-half ( $\frac{1}{2}$ ) inch ring in the proportions of 1 to 6, respectively. Note that this bonding course has all elements of high-grade Portland cement concrete, *except fine aggregate*,

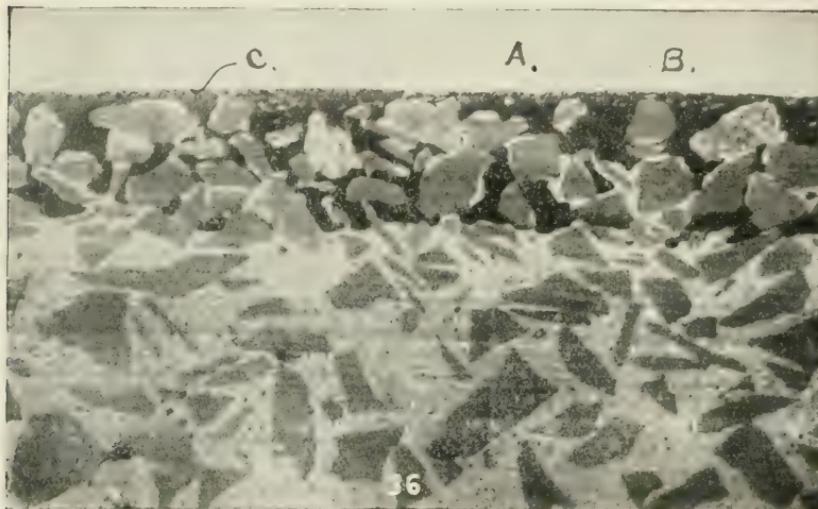


POROUS BONDING COURSE OF PORTLAND CEMENT CONCRETE BEFORE POURING WITH DOUBLE BOND BITUMEN.

thus leaving voids up to one-fourth ( $\frac{1}{4}$ ) inch size in the concrete, the *particles of stone being firmly bound together with neat Portland cement*. This bonding course is spread to a depth of *one and one-half inches* and compressed into the plastic concrete below, thus thoroughly blending the two courses of concrete and providing a total depth of *five (5) inches*, *the upper course of which is porous, but the particles thoroughly cemented with neat Portland cement*.

After the concrete has become sufficiently set the voids in the bonding course are flushed full with a specially prepared, tenacious, tough, asphaltic mixture sufficiently fluid to readily pour into and thoroughly fill the voids of the bonding course and sufficiently plastic so that, when cold, it adds much to the strength of and provides resiliency to the wearing surface. While the asphalt is still hot there is spread into it about one-half inch of hot dry crusher screenings or coarse sand, and within an hour the road is ready for traffic.

This photograph of sawed vertical cross section of "Bitustone Double Bond" is of a section cut from Middlesex Road, Newton,



SAWED CROSS SECTION OF BITUSTONE DOUBLE BOND COMPLETED ROADWAY.

after a full year's use, and illustrates how perfectly the two courses are blended together and how thoroughly the voids in the bonding course are filled with the bituminous material.

The name "Double Bond" is selected because the upper course is by an ingenious method "Double" bonded, first with Portland cement and then with asphaltic cement. Its superiority to either plain or coated concrete and to penetration or open mixed method of bituminous macadam is self-evident, more than justifying the difference in cost.

# AMERICAN SOCIETY OF ENGINEERING CONTRACTORS

11 BROADWAY, NEW YORK, U. S. A.

## FOURTH ANNUAL MEETING

OF THE

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS

### MORNING SESSION

Vice-President HOWARD J. COLE in Chair

MR. COLE (*Chairman*): The Fourth Annual Meeting of the American Society of Engineering Contractors is now open. The first order of business will be the reading of the Annual Reports of the Secretary and Treasurer. We will now hear the Report of the Secretary:

#### ANNUAL REPORT OF THE SECRETARY.

PREPARED BY ORDER OF THE BOARD OF DIRECTORS  
FOR YEAR ENDING DECEMBER 31, 1912.

In compliance with the By-Laws of the Board, I take pleasure in submitting herewith my Annual Report as Secretary for the year 1912.

#### MEMBERSHIP.

The following table gives an accurate record of the changes in membership during the year 1912:

Membership	Hon.	Mem.	Jun.	Asso.	Total
January 1, 1912	1	529	45	6	581
Elected 1912	0	84	7	1	92
Transferred 1912	0	5	0	0	—
 Total	1	618	52	7	673

Deaths	0	5	0	0	5
Resignations	0	24	1	0	25
Dropped	0	9	0	0	9
Transferred	0	0	5	0	
	—	—	—	—	—
Total	0	38	6	0	39

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Membership, Jan. 1, 1913	1	580	46	7	634
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The preceding table shows that the total increase in membership for the year 1912 was 92, including 84 members, 7 junior members, and 1 associate. It will be noted that this increase is not equal to that for 1911, when a total of 130 members were added to the rolls. However, the total loss in membership during the past year was only 39, including 5 deaths, 25 resignations, and 9 members dropped for non-payment of dues. This decrease compares most favorably with that for 1911, when 227 members were lost, including 4 deaths, 59 resignations and 164 members dropped for non-payment of dues. Also in the year 1911, the total membership of the Society fell from 678 on January 1st, to 581 on December 31st, whereas, the total membership for 1912 shows a gain of from 581 on January 1st to 634 on December 31st, or a net increase of 53 for the entire year. Taken all in all, the progress made in point of membership during the past year is most satisfactory.

In the Spring of 1912 a campaign for new members was undertaken and each and every member of the Society was urged to assist in this campaign. During the year only 34 of the entire membership, 634, responded to this call. These 34, however, were directly responsible for 80 of the 92 new members secured during 1912. They have won their place on the Honor Roll of the Society, and as Honor Men, I take pleasure in reading their names to you.

## HONOR ROLL.

Name	Members Secured
J. R. Wemlinger, New York City	8
H. J. Cole, New York City	6
W. R. Harris, Regina, Sask., Canada	6
Edward Wegmann, New York City	6
James Adkins, Jr., St. Louis, Mo.	5
Howard Egleston, New Orleans, La.	4
Charles Freund, New York City	4
A. Hardoncourt, Jr., Brooklyn, N. Y.	4
W. B. Bamford, Belmar, N. J.	3
G. L. Watson, Philadelphia, Pa.	3
C. F. Gillis, Saskatoon, Sask., Canada	2
W. J. Denniston, New York City	2
A. P. Greensfelder, St. Louis, Mo.	2
H. T. Hartwell, Tallulah Falls, Ga.	2
D. E. Henry, Manila, P. I.	2
H. F. Howe, Guayaquil, Ecuador, S. A.	2
K. R. Schuster, Brooklyn, N. Y.	2
E. A. Abadie, St. Louis, Mo.	1
T. H. Ahlborn, Waterloo, Iowa	1
O. P. Bailey, Minneapolis, Minn.	1
W. P. Carmichael, St. Louis, Mo.	1
F. H. Clutz, Chambersburg, Pa.	1
J. W. King, Miami, Fla.	1
W. J. Knight, St. Louis, Mo.	1
D. B. Luten, Indianapolis, Ind.	1
H. C. Lyons, New York City	1
J. P. Menard, Lac Long, Quebec, Canada	1
J. G. Moore, West Palm Beach, Fla.	1
R. S. Morrison, Bayside, L. I., N. Y.	1
R. E. Paget, Sealey, B. C., Canada	1
F. D. Purdy, St. Louis, Mo.	1
C. McN. Steeves, St. John, N. B., Canada	1
C. H. Watson, New York City	1
T. A. White, Kansas City, Mo.	1
34 Members	80

A campaign for new members is to be inaugurated at once, and it is hoped that in this campaign of 1913 a much larger proportion of the present membership will participate than in that of 1912. If each member of the Society would only pledge himself to secure *ONE* new Member during this year, the Society would easily double its present membership. It is hoped that each member who reads this report will recognize the importance of his participation in the present campaign, and that he will render such assistance as is possible in this respect.

Those members transferred during 1912 from junior membership to full membership are as follows:

M. C. Burr, Ft. George, B. C., Canada.  
C. F. Dingman, New York City.  
Edward Horstmann, Jr., Kearney, N. J.  
H. A. Paquette, Levis, Quebec, Canada.  
J. T. Walbridge, Chicago, Ill.

The losses by death reported during the year number only five, and are as follows:

John Mason Brown, 1912 Member, of Washington, D. C., died July 1st, 1912.

William Stuart Henry, Charter Member, of St. Louis, Mo., died January 27th, 1912.

Frederick A. B. Paterson, Charter Member, of Fairmont, Minn., died June 10th, 1912.

John S. Stiger, Charter Member, of Morristown, N. J., died October 5th, 1912.

Emerson J. Whetsel, Charter Member, of Elko, Nev., died May 11th, 1912.

#### MEETINGS.

During the year 1912, eleven meetings were held at which papers were read and discussed. These meetings were as follows:

Annual Meeting, January 9th, Afternoon Session.—Election of Officers. Reports of Secretary and Treasurer. Discussion of Society Affairs.

Annual Meeting, January 9th, Evening Session.—Presidential Address by Major Cassius E. Gillette, of Philadelphia, Pa.; Lantern slide talk on "Methods and Costs of Driving and Pulling Steel Sheet-Piling," by J. R. Wemlinger, of New York City.

February Meeting, February 8th.—Illustrated paper, "The Construction of a Forty-eight Inch Wood-Stave Pipe-Line for the Water Supply of Atlantic City, N. J.," by Mr. George L. Watson, of Philadelphia, Pa.

March Meeting, March 14th.—Illustrated paper, "The Construction and Moving of a Large Center for the Walnut Lane Bridge over Wissahickon Creek, Philadelphia, Pa.," by Mr. Moriz Bernstein, of Philadelphia, Pa.

April Meeting, April 11th.—Illustrated paper, "Concrete Piles and Concrete Piling Equipment," by Mr. Maxwell M. Upson, of New York City.

May Meeting, May 9th.—Illustrated paper, "Methods of Road Construction and the Problem of Dust Suppression," by Mr. Frank B. Earl, of New York City.

June Meeting, June 13th.—Illustrated paper, "The Economy and Benefit in the Use of Air Dump Cars on Railway Construction Work," by Mr. Maurice E. Davis, of New York City.

September Meeting, September 12th.—Illustrated paper, "Concrete Pavements—Methods and Cost of Construction," by Mr. Carl W. Boynton, of Chicago, Ill.

October Meeting, October 10th.—Illustrated paper, "Patented Concrete Bridges," by Mr. Daniel B. Luten, of Indianapolis, Ind.

November Meeting, November 14th.—Paper, "Some Objectionable Provisions in Government Contracts," by William B. King, of Washington, D. C.

December Meeting, December 12th.—Illustrated paper, "The Development of the Modern Country Roadway," by Mr. George C. Warren, of Boston, Mass.

The average attendance at the monthly meeting throughout the entire year was twenty-five, and at the Annual Meeting there were present fifty-two.

Approximately ten per cent. of the members in attendance at these meetings participated in the discussions.

## PUBLICATIONS.

During the year, nine issues of the *Journal* were published. The issue of December is still on press, but will be mailed the latter part of this month. The *Journal* was considerably enlarged in size during the current year and other improvements were effected. The nine issues of the *Journal* already published for 1912 more than equal in size the ten issues published during the year 1911. The *Journals* for the past year contained all of the papers and discussions read at the meetings of the Society during the year, and much valuable data in addition.

## LIBRARY.

The Library has not grown to any great extent during the past year. It consists at present of about fifty bound volumes, some two hundred unbound volumes, and a quantity of drawings, photographs, specimen contracts and specifications, etc. Several additions have been made to the exchange list, however, and the Society now has on file in its Reading Room about seventy-five of the principal technical publications.

## ADVERTISEMENTS.

The first issue of the *Journal* to carry advertisements was that for March, 1912. During the year twenty contracts for advertising space were secured. These contracts amounted to a total of \$766 of which \$323.85 has been collected. A number of new contracts have been secured for 1913, and it is reasonable to expect that this department of the *Journal* will be enlarged during the year.

This is one of the surest mediums of adding to the revenue of the Society, and it is hoped that every member who is in a position to do so will assist in the building up of the Advertising Department.

## COMMITTEE WORK.

One of the most notable features in the progress of the Society for the past year is the inauguration of the Technical Standards Committees. These committees are being rapidly organized, and the work of some of them has already begun. The researches of

these Committees, and the reports that they will submit during the present year, will undoubtedly add greatly to the work of the Society.

Inasmuch as detailed reports of the Committee work will be read at the afternoon session of this meeting, I shall not here enlarge on this subject.

#### YEAR BOOK.

It is our intention to issue a new Year Book during the Spring of this year. This volume will contain alphabetical, geographical, and classified lists of the members of the Society, the Constitution and By-Laws, lists of all committees, and other valuable data concerning the work of the Society.

As an assistance in preparing this Year Book, all members are urged to send in the postal card provided them, giving their name, address and occupation. It was owing to insufficient data of this character that the Society was unable to publish a Year Book during the year 1912.

#### MEMBERSHIP CERTIFICATES.

For some time past it has been the intention of the Society to have prepared a Certificate or Diploma of Membership, but as comparatively few orders were received for same, this matter has been postponed from time to time. It is now our intention to have these certificates prepared at an early date so that they may be ready for distribution during the spring. The certificates will be of attractive design, and suitable for framing. They will be engraved on heavy vellum paper, and their cost will be \$1.00. As the initial cost for preparing these certificates is somewhat high, it is hoped that all members who desire one will send in their orders promptly.

#### CONCLUSION.

In concluding this report, I would like to emphasize the importance of co-operation on the part of all members of the Society,—their assistance in securing new members, their activity in the committee work, their attendance at all meetings, their participation in all discussions, and their willingness to contribute to the

*Journal.* If the members will lend active and hearty co-operation in these respects during the present year, splendid progress will undoubtedly be made, and the American Society of Engineering Contractors will now and for all time win its place as the foremost Engineering-Contracting Association of this country, and through its work and influence will write its name large in the annals of the profession and business of Engineering-Contracting.

(Signed) J. R. WEMLINGER,  
Secretary.

MR. COLE (*Chairman*): You have heard the Report of the Secretary; what is your pleasure?

MR. KING: I move that the Report be accepted, approved and published in the *Journal*.

(Motion seconded, stated and carried.)

MR. COLE (*Chairman*): Next is the Report of the Treasurer:

#### ANNUAL REPORT OF THE TREASURER.

CONSISTING OF REPORT OF AUDITORS FOR YEARS 1911 AND 1912.

January 11, 1913.

The American Society of Engineering Contractors.

11 Broadway, New York City.

Gentlemen:—In accordance with your instructions I have audited your books for the year ending December 31st, 1912, and enclose you herewith statements as follows:

Statement of Income and Expenses for the two years ending December 31st, 1912 (the date of last closing of your books being January 1, 1911).

Statement of Assets and Liabilities, as at December 31st, 1912.

Yours very truly,  
D. F. KELLY,  
Certified Public Accountant.

## AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.

## INCOME AND EXPENSES FOR THE TWO YEARS ENDING DEC. 31, 1912.

## INCOME.

Dues .....	\$9,035.95
Entrance Fees .....	867.25
Badges sold .....	155.00
Advertising .....	323.85
Sale of Publications.....	638.50
	_____
	11,020.55

## EXPENSES.

Printing .....	\$6,141.38*
Stationery .....	70.15
Salaries—Officers, .....	360.00
Salaries—Clerical .....	2,486.00
Traveling Expenses .....	373.58
General Expenses .....	1,443.15
Rent—Office and Meeting Room.....	1,609.70
Telephone .....	162.90
Postage .....	119.33
Badges Purchased .....	33.80
Advertising Commission .....	41.44 12,921.43
	_____
Deficit for the two years ending December 31st, 1912.....	\$1,900.88

## AMERICAN SOCIETY OF ENGINEERING CONTRACTORS

## STATEMENT OF ASSETS AND LIABILITIES, DEC. 31, 1912.

## ASSETS.

Cash .....	\$ 40.09
Accounts Receivable—Members .....	3,724.00
Library .....	100.00
Furniture and Fixtures .....	276.90

\* This item includes, in addition to the actual cost of printing for the years 1911 and 1912, the cost of engraving, \$546.47, and the cost of reprints, \$704.16. This latter amount was not really an expense as the Society was reimbursed for same.

## LIABILITIES.

Accounts Payable .....	\$2,442.62
Bills Payable .....	500.00
Loan, E. Wegmann.....	207.00
Due Members on Certificates .....	23.00
Dues paid in advance .....	100.00
Due St. Louis Branch .....	46.75
Surplus Account—	
Balance, Jan. 1, 1911,.....	\$2,722.50
Less deficit for the two years ending December 31, 1912... 1,900.88	
	—————
Balance, Jan. 1, 1913.....	821.62
	—————
	\$4,140.99
	\$4,140.99

MR. KING: I move that the Report of the Treasurer be accepted, approved and published in the *Journal*.

(Motion seconded, stated and carried.)

MR. WEMLINGER (*Secretary*): The Report of the Treasurer does not include the dues for the current year; so that the deficit is apparent rather than real. The fact should also be considered that there is at present \$3,724 due the Society by members in arrears.

MR. COLE (*Chairman*): For the benefit of those present, I may say that the membership in most of the large national societies is more or less behind in the matter of dues. Some of them have a percentage of arrears as high as twenty-five, so it is not unusual for a new society to have a comparatively large number of delinquent members.

The Secretary has a record similar to the one which was read, showing the back dues for 1909, 1910 and 1911; some members are paying up each year; so the fact that we are a little behind in our collections is nothing to cause alarm.

MR. WEMLINGER (*Secretary*): As regards the proportion of the membership in arrears in the various national societies.—about one year ago I wrote to the secretaries of most of the im-

portant societies—not less than seven or eight—and I found the percentage to be about the same, some less and some more; twenty-five percent is not unusually high. Furthermore, it may be stated that the dues we are carrying for 1909, 1910 and 1911 are from members who have promised to pay. Others have been dropped. For 1912 we are carrying all of the members who are in arrears; but we propose to take some action regarding this matter at the next meeting of the Directors.

MR. COLE (*Chairman*): Unless a member gives a good, valid reason for not paying, he should be dropped. If he says he will meet the obligation, but cannot pay at once, we will of course carry him a while. No one outside of Mr. Wemlinger and his Assistant, Mr. Strickland, knows the names of those in arrears for dues.

MR. COLE (*Chairman*): Are there any communications, Mr. Secretary?

MR. WEMLINGER (*Secretary*): I have a good deal of information for this afternoon's meeting, but it is a question whether we shall have time to go into it this forenoon.

I have a telegram from the President, Major Gillette, stating that he missed his train but will be here later.

MR. COLE (*Chairman*): The report of the Tellers will not be announced until Mr. Gillette arrives, when it can be formally presented to the meeting.

It has been suggested that while waiting we might have an informal discussion as to how we can best further the interests of the Society. One member suggests that we might write a follow-up letter to the members in arrears and either tickle their vanity or touch their hearts in some way so they will pay up; and while we are here I think it would be well for each one to express fully his views; and it may be that some solution of our problem may be obtained thereby.

Gentlemen President Gillette having arrived, I will request him to take the Chair.

(President Gillette takes the Chair.)

MAJ. GILLETTE (*President*): Proceed, gentlemen.

MR. WEBER: With reference to Mr. Cole's remarks, stating that unquestionably a great percentage of the membership of this Society as in other societies need a little prodding: and just the kind of prodding they need can best be solved by a little general discussion among those present.

In a certain association in the City of New York, composed of concrete contractors, we have precisely the same thing to contend with. While the dues in this case give a little more reason for it—the dues are \$80 per year—still all members are good concerns. With this fact in view the executive committee revised the constitution of the association about one year ago, and invested itself with power to remit the dues of any member it saw fit, provided such action should be for the best interests of the association. The result is that a delinquent member gets a letter from the secretary to the effect that he is wanted at a meeting of the executive committee to show cause why his dues are not paid, or why he should not be dropped for not paying same, or why they should not be remitted—the form of letter being determined with reference to that particular member or firm. The letter in regard to remitting the dues of the member immediately appeals to the sense of honor in the man; it states that his funds are probably tied up in such a way that he cannot conveniently withdraw sufficient for the dues at that time, etc., and the result in most cases is that the man comes down and says: "What is this? I've got eighty dollars." And then we tell him the place to deposit it is with the treasurer. You can in that way hit him over the head with a nice soft club, and the chances are a check will come back to you in a day or two.

MR. GILLETTE (*President*): It seems to me that is a very good idea. Are there any other remarks under this heading?

MR. WEMLINGER (*Secretary*): I suggest that Mr. Weber give us copies of those letters, as we might get some valuable suggestions from them.

MR. COLE: Would it not be well to recount briefly in our letter what the expenses of the Society are each year: so that the member can see the Society needs his money if he expects to stay in.

MR. GILLETTE (*President*): I should think the best way would be to authorize the Secretary of the Board of Directors to remit dues and then get up a form letter and try it on a few and see how it works; if it does not work satisfactorily it can then be changed.

MR. FREUND: There is a Legal Board in a Society to which I belong, and they furnish aid to a certain extent in the collection of bad accounts; the members value this as much as anything else they get. The Board takes up old accounts and if a debtor refuses to pay, they write to the debtor and inform him that unless he pays or gives good reason for not doing so, they will post his name before the members of the Society, and that usually makes the man "come across." I know for a fact that this has helped to bring back money nearly lost to the members of that Society.

That scheme seemed to be valuable above everything else they did. Although you do not sue a man you suggest a way of reaching him if he does not pay up.

I think a department doing that work might help to increase the membership of our Society.

MR. GILLETTE (*President*): It might help to increase the membership and it might also increase the promptness with which the dues are paid. It would be a good idea to make our Society useful to its membership, particularly if a person was doing work for people in a similar business, after giving the debtor a chance to be heard. But it would not be fair to post a man for not paying his bills to a member of the Society without hearing his side. We should hear both sides. But we should let the man know that the fact of his non-payment is known to a lot of people in the same line of business, the fact that he does not pay just claims; that will benefit our membership, and if that service only took into consideration those whose dues had been paid in full or paid promptly it would be a good thing. But we should take no action if a man had not paid his dues within sixty days of the time they were due.

MR. FREUND: Now as a further proof of the value of that part of the work of the Society I mentioned: a member of that society informed me that they secured one out of every five of the people they go after for membership. They find their work is excellent, especially with those who have paid up. They say: "They made me pay up, and I think I will try the same method to make others pay up." They have a charge of ten dollars a year and they do not give the members the benefits that our Society does. They merely post the name of the man who refuses to pay; and it certainly does the trick, since it makes a man pay up, or give a good reason for not doing so. That society is composed mostly of material men who are no doubt entitled to some protection.

MR. BAMPFORD: How are the names posted, and how large is the membership?

MR. FREUND: The names are posted at the meetings; and that makes the meetings interesting as the members feel they get something for their membership. I know of people who go there every month to see the names of those who do not pay their bills. The membership is not as large as ours.

If you write a letter to a delinquent member telling him: "I will have to post your name before the American Society of Engineering Contractors as a man who does not pay a just claim," it will have, I believe, an effect beyond what you would imagine. No man wants to have it advertised that he does not pay his bills.

MR. GUILLETTE (*President*): There are a great many ways in which we might act jointly as a Society in which the individual member does not want to act. We can do a great deal in that way. A contractor who is oppressed by a municipality does not want to do anything; but the Society can take action against the municipality and it does not hurt the contractor. There are many ways and things that this Society can do to aid its members, which we do not touch now. I think the more ways we can devise of being useful to our members, especially by taking responsibility that is difficult or inadvisable or impossible for an individual mem-

ber to take, the more important we will be and the more we will thrive.

Are there any other suggestions?

MR. FREUND: It might be advisable to have it mentioned in the application blank that these benefits accrue to members.

MR. BAMPFORD: Is the collection of debts the principal object of the organization you referred to?

MR. FREUND: It is one of the principal objects of the Society, but the best part of it is that as far as I know they have no special committee: they merely send out a form letter, stating that such a one owes money to a member, and that unless he is paid by a certain time, or gives good reason for non-payment, the Society will have to publish his name.

MR. COLE: It would appear to me that such a business is more that of a collection agency than of an association like ours.

How are the dues in that Society paid and what proportion of the dues are unpaid? Our proposition is to collect what is due to the Society and not to its members. If your association has dues of ten dollars a year, how many of your members are in arrears at the end of the year?

MR. FREUND: I do not know; but I know there is no deficit shown.

MR. COLE: That is one of the things you can show on paper either way—a deficit or a surplus.

MR. FREUND: They have no reason for showing them. The books are practically open to the members, and although this is not for the actual collection of the dues, it would nevertheless help the collection of the dues, as you do only this for members in good standing.

I do not believe there is one of us that has not some account he would like to collect, and for that reason you are touching every member of the Association or Society.

MR. COLE: It is not exactly a parallel case, Mr. President. What we are after is: we are now a group of members of an organization, a Society, gathered together as a Ways and Means Committee, so to speak, and one gentleman has suggested that

he thinks our dues are too small, and yet all the arrears are from people who are falling down on the ten dollar proposition. He thinks we should raise the dues; but judging from our Treasurer's report, can a man pay twelve or fifteen dollars if he cannot pay ten? If with 634 members, we have twenty or twenty-five percent in arrears, it is a very easy matter to calculate what our revenue would be each year if we could change our annual dues to \$15.

Another suggestion by one of the gentlemen present is that when a notification is sent out by the Secretary to the different members of the Society, stating that they want his name in order to insert it in the coming list of members, that it would be wise at that time to state that this list of members will be issued only to those members who are in good standing on the first of February, say, of this year.

MR. STRICKLAND: I do not think it would be a good idea to raise the dues of this Society. We have 634 members at the present time and 226 are in arrears for dues of 1912 or more. Practically one hundred of them have stated that they were hard-pressed for cash and could not spare the ten dollars at this time. I believe, therefore, that it would have a bad effect to attempt to raise the annual dues. The practical method for getting these dues would be to write circular letters to the members in arrears and if possible get their promise to pay within a certain time.

The best thing to increase the income of the Society is to get the co-operation of all members in an effort to increase the membership during the coming year. We should try to get each member pledged to secure one or more members during the year. I think that would be more to the point than raising dues, and I think it is decidedly to the best interests of the Society.

MR. BOSCH: The matter of raising dues is not before the Society—that would require a constitutional amendment. This Society appeals to me as a business proposition. The membership is composed of business people—engineers and contractors. Now if from 200 delinquents you have fifty who promise to pay some day, get those fifty to set a definite date for payment, and

then send them a blank note for the amount of money due, payable at the deferred date. A contractor may have a contract on which his payment for work is deferred, an engineer's fees may be deferred on some engineering proposition, but if you can get him to set a definite date in the future, and then change that into a promissory note falling due at the suggested date, then we have a business proposition, and one that a man, as a man of honor, will pay.

I talked to Mr. Cole relative to the Year Book, and it was my suggestion that the list should contain only the names of those who have paid their dues. Possibly it would be better to defer the publication of this list until March 1st.

We want to look upon this thing in a rational manner and put ourselves in the position of the delinquent member. If we make allowance for those things we will do wisely. I think the best thing is, as I said before, to get the promise of the member to pay at a certain date, and then have him put that promise into the form of a promissory note, and I believe the man will pay it. Now our Year Book gets into the hands of a good many people. There are many new things that come from the manufacturers' hands each year; and when I receive notice of something new I know my membership here is responsible for that new appliance being brought to my attention. I thus realize the tangible value of my membership in this Society. That is one of the main things that appeals to me as a contractor. Something is occasionally brought to my notice in that way that is worth more than the dues I pay.

The delinquent members are probably scattered abroad, far from New York City—in other States. They do not get to the monthly meetings or to the annual meeting; and all they have in common with this Society is the receipt, at stated intervals of our *Journal*.

Now, the articles in the *Journal* are all good and high-class; but an article along certain lines will appeal to certain elements of our membership; while another article will appeal to another class of our membership. Every leading article does not appeal to the majority of our membership. And when the *Journal*

reaches a man, with an article on concrete piles, for example, the man being, say, in Colorado, or in the mountains, will probably remark: "I am not in the meadows near Newark. I will not drive a concrete pile here in a lifetime. What good do I derive from my membership in this Association?" If, however, we call his attention to the fact that the possession of the membership list will bring to his notice a certain appliance at the most opportune moment, then ten dollars is a mighty small proposition to consider in that connection.

MR. BAMFORD: The remarks by Mr. Bosch and the earlier remarks by different members, have crystallized in my mind an idea which, if put to execution, should make the Society of greater benefit to its membership, and consequently, should result in the prompt payment of our dues. That is the possibility of devising a "Question Department," so that members of the Society, scattered as they are all over the country, many of them in out-of-the-way districts, can use the Society as a bureau of information. That is a field for activity by a technical society. If the members understand that questions are answered only for those whose dues are paid, that will be an incentive to make delinquents pay up. I do not know of any technical society which has made an information bureau a feature; and I think it offers a valuable field for this Society.

Regarding Mr. Bosch's suggestion that a man give his note for his back dues, I doubt very much whether we could get our out-of-town members to give notes, even though they might agree to pay at a specified time. One very efficient method of collecting debts which has come to my attention is the presentation of a draft on the indebted to a New York bank, which forwards it to a bank in the individual's town for collection. The charge for collection is very small. Of course, if the individual refuses to pay the draft, it comes back dishonored. A man hates to have his bank say: "Here is a draft on you for ten dollars; will you honor it?" He hates to refuse and will generally pay it. Small accounts must be collected, and the banks do that sort of thing, and in a very few cases are the drafts refused. Where they were refused, the man was usually in an insolvent condition. We

might receive some resignations, but we will collect some of the money due.

MR. HARDONCOURT: We should have a Bureau of Information. It may not be possible to inaugurate such a bureau in the coming year, but we should have it next year. But let it be useful to the public largely interested in the engineering line as well as to members of the Society.

Suppose a member wants to know something about a particular manufacturer, or a certain article of manufacture, the Society will render the service for the cost of the search. Let it be open to the general public. Very few people would ask questions without becoming members: but we would not impose any obligation of dues. It would only be the initial cost of making the search and any other legitimate expense that the Society might incur. Many architects would be glad to call up to ascertain who makes a certain article, as quite often the name of the manufacturer is unknown. We should have a card index. That will add some expense to the Society, but I think it will soon pay.

I do not think the bureau should be limited to the members in good standing. I think we should endeavor to benefit the profession at large.

MR. FREUND: A recent issue of the *Journal* contained an article on road-construction. At that time I had some dealings with a contractor interested in road work and I sent him a copy of that issue with the result that he applied for membership. This would seem to indicate that, if the *Journal* were sent to men engaged in the line of work discussed in the principal paper it contained, it would prove a means of increasing our membership.

MR. KING: How we shall collect our dues, is the question, and the discussion is assuming a wide range; yet everything said is cognate to it. I have been very much impressed with the views expressed. They are divisible into two groups; first, the direct, and second, the indirect method of securing the payment of dues. In the direct method there must be a systematic way of following up those in arrears with strong circular letters, and, by this method, I think a great deal of good can be done.

The suggestion of drawing on members for dues, and the other proposed methods of coercion, may be open to question as to their advisability. These members who are delinquent are probably as good people as we want except for this carelessness in that respect. We do not want to get rid of them but we want to bind them closer to the Society. I think we should use such efforts, as we can in a friendly way, rather than too much coercion. But the fundamental consideration is to make the Society of greater benefit to its members.

Doubtless a good portion of these people who have not paid think, "I do not see ten dollars worth in the Society to me." Likewise there are hundreds of valuable men who would become members if they saw the Society was doing something that appealed directly to them. We have six hundred and fifty members, while there must be six thousand persons who would join this Society if we could convince them of any real benefit accruing therefrom.

Mr. Freund suggested that this Society might attract some members if we aided them in the collection of their accounts; and he instances one case. He said it had not only induced those already in the Society he spoke of to continue, but has caused others to join after they have had convincing proof of the effectiveness of the Society's work in making people pay up. I think that is a very good point. If that can be worked out practically, I believe it might be adopted, and adopted promptly with very good success. There can be no doubt that persons a little slow in the payment of their bills would be considerably affected by the fact that it would be brought to the knowledge of the Society and would be made known to all its members that they did not pay their just debts.

Now, the next suggestion is Mr. Bamford's concerning the Question Box. I am very much impressed with that. I take a little weekly, *The Literary Review* of the *New York Times*. That has a page devoted to questions, "How big was Alexander. Pa?—and why was he called 'Great'?" and such things. *The Boston Transcript* has a Question Box on genealogical subjects; and if you write to them they will tell you the name of your grand-

mother. The *New York Sunday Sun* has a column on the classic American game of Poker; and they will tell you how many chances you have of getting a flush if you have a boxtail to begin with.

All this shows the popular interest in the asking of questions and the answering of them.

I was struck recently by an instance in *Engineering Law*, which is a very creditable paper started in this city by one of our members, Professor Alexander Haring. In his last issue Prof. Haring announced that he would start a question box, and "Now send on your questions" the article ended.

Similarly, there must be a great many questions arising under contract, perfectly simple questions of law, about the manner of executing a contract or the form of it, or what the contractor should do under certain circumstances, that might readily be answered by any lawyer who had looked into the subject. There must also be technical questions which I would not presume to answer here. Besides some will want to know where to get certain manufactured articles—special articles, that are specified. Such questions are always coming up.

If the utility of the Society increases so that a larger membership might send in too many questions for our force, it might be necessary to employ some engineer or lawyer who would be prepared to answer these questions for a moderate salary. Therefore I am very strongly inclined to Mr. Bamford's idea that the Society could make itself very useful by saying it would insert in the Journal the questions submitted to it, and the answers from some proper authority. Of course, there must be some limit to these. No lawyer or engineer would want to spend half a day looking up recondite questions of law or engineering. But in the end it might be an important point to have that Bureau; and the Society by paying an expert could get a large amount of work. Expert service by cooperation can be had much cheaper than by each member going to the local engineer or lawyer, to get the questions answered.

I think it would be wise for the Board of Directors to take that subject into consideration to see if we could not start a Question Bureau, first, by volunteer efforts on the part of the members in the answering of questions.

MR. FREUND: In the matter of an Information Bureau for materials, there are two such Bureaus in New York City at the present time, and one of them, the Merchants' Library, is at 30 Church Street. I understand that the experts in charge of it are highly paid men and that they go to great expense to get the information.

The Builders' Association, on 33rd Street, also has an index system where one can look up the name and address of the manufacturer of any building-material item. I understand that is a matter of quite large expense.

They send to each manufacturer a letter asking for a catalogue, which necessitates a large number of files; and the filing of the catalogues and keeping them up to date is quite expensive. The number of files kept in these different Bureaus sometimes runs into three figures, and the cabinets alone are worth a good deal of money, without including labor required for filing and keeping the index up to date.

MR. BAMPFORD: I am fairly well informed on the method of a number of the organizations which furnish such information, and I had in mind the possibility of this Society utilizing the organizations later in co-operation with this Society.

Let us start such a bureau and see what develops. There may be a few questions which we will have to refer to other organizations, and as we develop this field we will see whether it goes beyond our abilities to handle them, and if so we can effect a more permanent co-operation with these organizations to get the best results. It is a matter susceptible of the largest development. A man can ask a question that is so complicated that he could be told properly only by an expert after careful study.

But by starting this bureau and making it a factor it would undoubtedly help the Society. If the members understand that

questions can be asked only by those in good standing, it will probably expedite the payment of dues.

MR. SNYDER: There would doubtless be times when questions could be put up to the Society in general for any member to answer, which might lead to discussions of benefit.

MR. COLE: The gist of the whole matter is summed up by Mr. Bamford, and that is that this thing is limited to the members of the Society in good standing. And when our members understand that this is for members in good standing we will get prompt results.

Now regarding a certificate of membership, I would suggest that that be sent or sold only to those in good standing. A man may be in arrears for personal dues and if he sends a dollar for a certificate his dollar should be returned to him or applied on account of his dues for which he is in arrears; and he should be notified that as soon as he brings his delinquency up to date he will be eligible for a Certificate of Membership. All our work should be along those lines, and nothing should be given to the members gratis, unless it is to a member in good standing.

I understand there is to be a meeting of the Board this afternoon, and I make the motion now that it is the sense of this meeting that the Board of Directors be asked to institute in the next issue of the *Journal* of the Society a Question Box, with these provisoës: that the questions will be answered by men of repute and answers only given to those members who are in good standing; that a reply be sent to the original inquirer at once by mail; and that the question and its answer be repeated in the *Journal* for the general information of the members at large.

I now make such a motion, Mr. President.

(The motion was seconded.)

MAJ. GILLETTE (*President*): You have heard the motion. All in favor say "AYE," contrary minded "NO." It is carried unanimously.

(Continuing) The Chair has a few remarks which it would add to the general collection:

In part of the discussion I think we rather overlooked the fact that our list of members is an asset. I do not think we should be too severe in the matter of chopping off members or discharging them. A good membership list attracts more members, so that if we cut down our membership to make people pay their ten dollars we are liable to bite off our own nose to spite our face.

The next point, it strikes me, is to get income; and the best way to get income is to get members; and the best way to get members is for the members to work for new members, basing their efforts on the idea that the Society will be useful to the incoming members.

We have relied altogether too much upon our *Journal*. Our membership is covering the entire field of engineering contracting, and contractors' engineering. We could not begin to keep up with the interesting amount of literature in the field if we published a volume as large as Webster's Dictionary every week. It is almost hopeless to get in the membership we could by articles we could possibly produce, for the reason that there is a special *Journal* for almost every kind of engineering, and each one of these journals can equal or beat us in that field, if we confined ourselves to that single field only.

Therefore, we must realize that the articles we have wisely used as an attraction to bring people into our Society, cannot be sufficient to keep interest in a special field of engineering. We can put in some special articles not found in other journals—something done by contractors rather than by engineers—as the engineering field is wonderfully well covered now.

They have another advantage over us, in that they make their money out of advertising, and they can afford to pay people to write articles in addition to those which are contributed for "professional advertising"—I think that is the accepted term. Therefore, we cannot hope to compete with them there. But I think we might steal a little of their thunder in the advertising line, and in this way: We have not a subscription list big enough

to charge exorbitant rates for advertising and then get the advertising: but if this Question Box were extended to include special information about materials and machinery and the Society should send a letter to each manufacturer of machinery telling him about the department, then, at the end of the year, send a letter to each of the machinery manufacturers to whom you have sent for information in response to inquiries, telling them you have sent so many inquiries for their machinery to them during the past year, and suggesting that it would be wise and proper and save us some trouble while bringing them some business, if they carried a little notice of their company in the advertising columns of our *Journal*. I think we could get advertisements in that way; and advertisements give the sinews of war.

The daily papers do not make their money from selling papers; it is made from their advertisements. Now that is the only way we can get into the advertising business, as we haven't subscribers enough to attract them with our circulation. But if we advertise them free a little while, at the cost of a postage stamp or two, we can do something.

Another point is that our answers must be given out monthly if limited to publication in the *Journal*. I know that some journals instead of having regular formal question and answer boxes print the answers as simple points of information. The Mining and Scientific Press concentrates the question in the answers. They do not clutter their pages with the question and then the answer. If it does not advertise itself so well as a Question Box it still has its advantages and points of attraction.

I think it would be well to have an official answer of the Society to the question in the first number as it comes out, and then invite answers. I would answer any question by mail, but I would not answer them by mail to anyone but members of the Society in good standing. But if a question brought up a subject of importance to many people we should answer it in our monthly journal whether a man who was back in the payment of his dues got the advantage of the answer or not.

MR. WEBER: In the matter of getting in the money from delinquent members it might not be amiss to make this suggestion to those having this matter in charge. Send out a letter broadcast—it would probably cost about \$25 for the whole scheme, but no doubt we could get in \$100 or \$200 by it—and ask each member of the Society, regardless of his standing on the books, the question of "What is the best method of collecting back dues from the members of this Society?" and then illustrate under that why you do it. We have, say, six hundred members; we have two hundred delinquent members. Tell them we need the money to conduct the affairs of this Society and to disseminate the knowledge which you are paying for. Then ask: "What in your opinion is the best way to collect these outstanding dues?" and I guarantee that many of these over-due fellows will come back at you with a check.

MAJ. GILLETTE (*President*): One point I left out was this: To make this Society useful its main field would not be the educational, for that is already covered; but to give to the individuals who compose it the benefit of a Society standing together as one man. We must give people to understand that if they belong to this Society they will not only get the literature that we publish, but the advantage of our strength behind them where they are not treated fairly through unpaid bills or through discrimination against them, or in legislation, or in the thousand or more things where the members of this body pulling together can be infinitely stronger than each of them pulling separately. We must be useful to these people by doing what is helpful to them. The strength of organization is what we are to consider. We must apply our brains to the question of how we can be useful to our members. How we can aid them in their troubles.

I think one way of doing good work in that direction is to protect our members against discrimination and injustice, and in many cases do it so that the member does not appear. We should develop and work that out. Many contractors all over the country who are trying to work for municipalities have no show at all,

as they do not stand in with the "gang." There is a trial going on in Philadelphia now where a good square contractor is likely to be punished because the crooks in office held him up, and he had to take the contracts at prices they dictated. He did not rise to the moral point of not taking such contracts; but it goes without saying that in many cases if he had not taken it other parties would have done so. There are men who are held up by crooked officials, and they are put to all sorts of trouble because they cannot get business otherwise.

I believe it was impossible for San Francisco to have a street-car system some time ago without bribing officials. It is not a matter of individuals, but of "The System"; and this kind of Society can be useful by ripping out that kind of system. It is a disgraceful thing that a reputable contractor cannot get a contract to build a fire-station in a city without descending to corruption.

This Society can be useful in the specification of materials where only one contractor can get the materials, as in the case of the creosoted wood. It is such things as that for which we wish to work—the advantage of our members, and give them the benefits of union. Then we will get new members and get them by the thousand.

MR. KING: I think, Mr. President, there was nothing included in the motion as adopted as to the work of the Society in the collection of debts. I, therefore, move that the Board of Directors take into consideration the question of whether the Society can be of use to the members in the collection of debts.

(Motion seconded, stated and carried.)

MR. WEBER: Now, Mr. Chairman, a few more remarks on the strength of organization. There is in this city an organization—I do not know whether there are any of its members present—the membership of which is practically in the building line: that is known as The Building Trades Employers' Association. That is a body composed of thirty-two trade associations,

and its main object is to deal with labor. Anyone familiar with the conditions of labor in New York City knows what that means. It is a short sentence, but it is an awful problem.

The only way in which that association has been able to protect its members is through the strength of its organization backed up by the dollars necessary to conduct the fight. Up to this year the dues of that association have been twenty dollars per member. Every time a fight in a trade comes up the Building Trades Employers' Association, if the fight is a just one, gets back or behind that branch organization. The result is that it has won out by beating the men, but at a cost to the association varying from \$60,000 to \$80,000 in each individual case; and there have been three since the disruption of the Arbitration Board, which maintained peace in this city for six years, without a strike. Last year the Constitutions Committee of The Building Trades Employers' Association got together and devised a scheme by which each member would pay for his individual amount of protection derived from that body. That payment is to be based in amount on the volume of business he had done in Greater New York during the previous year. Each member is entitled to the protection of the association; but, formerly, the man or firm doing a business of ten million dollars a year secured the same protection as the man doing ten thousand dollars of business per year; they each paid the same dues, which was a rather crude situation to say the least.

That method of payment of dues was then revised in this way: To each firm was sent a set of cards with amounts running from \$15,000 to \$15,000,000, and a letter representing each amount affixed thereto. A member puts a cross mark against that letter which represents the amount of business he does or did the previous year in the City of New York. And upon that he pays one-twentieth of one per cent.; the idea being to create a fund of \$300,000 to shake in the face of anybody who starts up with the idea that they will create havoc in the building trades of the City of New York.

Each man under that plan pays for the protection that he receives in proportion to the amount of business he does. And that is working out beautifully. When that fund of \$300,000 has been reached the dues stop until it is brought below a certain mark—I think it is \$250,000—then they begin again. So that the method pursued in former years, in the event of a strike the word went forth to the faithful—there were about 1,000 members in the association—that the treasury was dry and needed funds, and everybody sent in his money. But a certain few really carried the burden, and from \$60,000 to \$70,000 was collected.

Now if you will create a fund in this association it will greatly help you when you start your work. And you will need a fund to fight the particular element our President has pointed out as being a menace to our Society members.

MR. COLE: There was a great deal of meat in Mr. Weber's suggestion; but before the meeting is declared adjourned for the morning, Mr. President, let me say that before you entered the room this morning we had just received the report of the Tellers; and as it was not read we would like **to** hear it now.

#### REPORT OF TELLERS.

MAJ. GILLETTE (*President*): Gentlemen, we will now hear the report of the Tellers.

MR. WEMLINGER (*Secretary*): Mr. Chairman, the report of the Tellers is as follows:

Total votes cast, 192.

For President: Mr. Cole, 143; Mr. Greensfelder, 46.

For First Vice-President: Mr. Balcomb, 30; Mr. Wegmann, 159.

For Second Vice-President: Mr. Clark, 124; Mr. Troman-hauser, 65.

For Directors: Mr. Cody, 90; Mr. Peck, 93; Mr. Luten, 77; Mr. Moore, 107; Mr. Bent, 95; Mr. Egleston, 84.

First Amendment adopted with 8 negative votes; third Amendment with 7 negative votes; second, fourth and fifth Amendments with 1 negative vote each; sixth, seventh, eighth and ninth Amendments, unanimously.

MAJ. GILLETTE (*President*): Gentlemen, you have heard the report of the Tellers.

I declare Mr. Howard J. Cole elected President of the American Society of Engineering Contractors for the year 1913, and other officers as follows:

First Vice-President, Edward Wegmann.

Second Vice-President, George T. Clark.

Directors: Leon F. Peck, DeWitt V. Moore and Arthur S. Bent.

The nine Amendments to the Constitution have been passed and are, therefore, adopted.

(Applause.)

MR. BAMFORD: I will make a motion to clinch the discussion of Mr. Weber, if he will accept it. I would move that he be appointed chairman of a committee, with power to select the other members of his committee, to devise and submit to the Board of Direction ways and means for the protection of the membership in construction work.

The particular steps which we can take is a question with which he has shown himself to be familiar. Something should be done, and we should devise some method and crystallize it into practice. We must have a committee.

(Motion seconded.)

MR. WEBER: I heartily appreciate the sentiment of the gentleman, but I want to say this: that I do not believe I could give the matter the time it would require—for one thing; secondly, I do not believe I would be qualified in this particular instance, because having become only recently one of your members, I am not yet thoroughly conversant with its principles and the busi-

ness it is conducting to take hold of this committee work. I am tied up in New York for every spare moment I have outside of my business, which is the source of my existence and income, as with all of us, and I do not think I could give that committee the time, as it will require an enormous amount of time to get the matter in shape. If such a committee could be appointed from the membership of this Society with a chairman who has been connected with the Society since its inception, and who knows the membership throughout the country, that is the man you should have as the chairman of your committee. I would be willing to assist such a committee in every way possible, and occupying the position of Vice-President of the Building Trades, I think we could give that committee considerable assistance.

MR. COLE: I suppose the subject is open to discussion. I might make a suggestion as an amendment to that motion that instead of making Mr. Weber chairman of the committee you make him the committee, a committee of one to formulate his ideas and to present them to the Board of Direction. And with that as a basis, perhaps get the matter into final shape, and then associate with Mr. Weber some men who by that time we could select—men like Mr. Gillette and others, who could then crystallize these things and make them applicable to the workings of our Society.

MR. BAMFORD: I think I should go further by leaving it to Mr. Weber with power to select his associates. That would leave him as a committee of one until such time as he needs associates. He could present a report himself, or increase his membership when he saw fit.

MR. WEMLINGER (*Secretary*): I would suggest that this subject be discussed further before definite action be taken, and I now move that we take a recess for luncheon, as we have only a short time until two o'clock, when we have to meet for the afternoon session.

This will be a very important session. As you will note by the program, Mr. William L. Bowman, Civil Engineer and Attorney-at-Law, of this city, will read a paper on the "Legal Questions

Involved in the Proposed Amendment to the General Municipal Law of New York." Mr. Bowman is a member of our Committee on Legislation and has given close attention to this proposed amendment. In his paper he will discuss the matter from both the engineering and the legal standpoints.

The committee reports will also be presented at the Afternoon Session, and while none of the committees has as yet concluded its work, the reports will be instructive in showing the progress that the Society is making in this respect.

We want every member now present to be on hand for the Afternoon Session.

MR. GILLETTE (*President*): If there are no further remarks the meeting stands adjourned until 2 P. M.



# AMERICAN SOCIETY OF ENGINEERING CONTRACTORS

11 BROADWAY, NEW YORK, U. S. A.

## COMMITTEE REPORTS

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### REPORT OF COMMITTEE "A." GENERAL COMMITTEE ON CONTRACTS.

The standardizing of contracts, in order to establish equitable and just relations between all parties, is one of the most important subjects to be undertaken by this Society.

The contract is the written code devised to establish the rights, duties, and obligations of the contracting parties. In case of dispute or disagreement, it is the authoritative instrument which the law attempts to interpret in order to legally determine the rights of the disputants.

The law interprets contracts not from the viewpoint of equity and justice, but from the more severe one of the intention of the contracting parties as expressed in their signed documents. As long as the provisions are legal, the law does not take cognizance of the justice or equity of the contract provisions. The Supreme Court of the United States, in the case of *Upton vs. Tribilcock*, 91 U. S. 45, has held that a contractor is bound by the language used in his contract even though he did not read it.

The written contract controls even though one or both parties may insist in perfect good faith that it was not their intention to so provide, but that, on the contrary, their intention was diametrically the opposite.

Such a contention cannot be sustained; nor is evidence admissible in support thereof. The Supreme Court of the United States has at least twice so ruled.

In *Brawley vs. United States*, 96 U. S. 173-174, Mr. Justice Bradley used this language:

"The written contract merged all previous negotiations, and is presumed, in law, to express the final understanding of the parties. If the contract did not express the *true* agreement, *it was claimant's folly to have signed it*. The court cannot be governed by any such outside considerations. Previous and contemporary transactions and facts may be very properly taken into consideration to ascertain the subject-matter of a contract, and the sense in which the parties may have used particular terms, but *not to alter or modify the plain language which they have used*."

In the case of *Seits vs. Brewer's Refrigerating Co.*, 141 U. S. 517, Mr. Chief Justice Fuller thus expressed his views on the same question:

"Undoubtedly the existence of a separate oral agreement as to any matter on which a written contract is silent, and which is not inconsistent with its terms, may be proven by parol, if under the circumstances of the particular case it may properly be inferred that the parties did not intend the written paper to be a complete and final statement of the whole transaction between them. But such an agreement must not only be collateral, but *must relate to a subject distinct from that to which the written contract applies*; that is, it must not be so closely connected with the principal transaction as to form part and parcel of it. And when the writing itself upon its face is couched in such terms as import a complete legal obligation without any uncertainty as to the object or extent of the agreement, it is conclusively presumed that the whole engagement of the parties, and the extent and manner of their undertaking, were deduced to writing."

In order to remedy the injustice of the modern construction contract, two courses are open to reach some fair and equitable common ground. The first course is to have the government and the several states enact a law establishing certain fundamentals regarding public and private construction contracts. The second course is for representative national organizations to adopt and recommend for general practice standard forms of contracts.

The first course has not as yet been invoked, except in certain specific instances, to cover the broad subject of construction contracts. This Society has, however, started to prepare such a law and has drafted a tentative form\*, which, however, needs more careful study and analysis before it should be submitted to legislative bodies.

\* *Journal Am. Soc. Eng. Contractors*, Vol. IV, p. 257 (1912).

The second course has been followed recently by a number of organizations in adopting standard contract forms. Among them the following might be mentioned:

Buildings—Agreement and Conditions of Contract for, adopted (final revision 1905) by Royal Institute of British Architects, Institute of Builders, and National Federation of Building Trades Employers of Great Britain and Ireland.

Buildings—Agreement and Conditions of Contract for, adopted (April 1911) by American Institute of Architects.

Buildings—Uniform Contract for, adopted (1905) by American Institute of Architects and National Association of Builders.

Buildings—Illinois Building Contract, adopted (June 1911) by Chicago Architects' Business Association, Western Society of Engineers and seven associations of contractors and manufacturers.

Electrical Work—Agreement and Conditions of Contract for, adopted (1906) by Institute of Electrical Engineers (British) and other organizations.

Railroad Work—Agreement and Conditions of Contract for, in preparation since 1906 by American Railway Engineering Association.

The difference between public and private contracts is one of detail and not of principle. The details are, however, of such a nature that separate standard contract forms are necessary. This Society is fortunate in having committees to cover both public and private contracts. It is expected that both these committees will make reports this afternoon.

After this society has adopted forms for standard construction contracts, it will be possible to seek coöperation with other national organizations looking to joint action in the adoption or endorsement of standard contracts.

#### RECOMMENDATIONS.

As stated in the report of Committee "A-2" on Private Construction Contracts, (presented herewith), there are three general "forms" of construction contracts, namely:

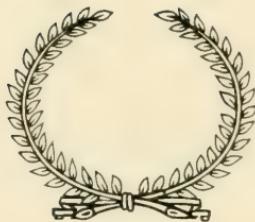
- (a) Erecting Contracts;
- (b) Designing and Erecting Contracts, and
- (c) Warranting Design and Erecting Contracts,

and these forms are modified basically by the method of compensation, whether (a) "unsecured cost," or (b) "secured cost," and also by the method for interpreting contract provisions, whether by a (c) technical advisor of the owner, or by (d) arbitration.

Committee "A-2" has submitted a form for an "Unsecured-Cost Erecting" Contract. Your committee heartily indorses this form and recommends that it be adopted as a "tentative standard" and printed for criticism and discussion, and later be submitted for adoption as a "Technical Standard" of this Society.

All of which is respectfully submitted.

W. B. BAMFORD,  
Chairman



## REPORT OF SUB-COMMITTEE A-1 ON PUBLIC CONSTRUCTION CONTRACTS.

The undersigned, Chairman and sole member of the Sub-Committee on Public Construction Contracts, delivered at the November meeting of the Society a paper on "Some Objectionable Provisions in Government Contracts," which was printed in the November issue of the Journal. He presents the views expressed in this paper as substantially a portion of the committee report, but for the sake of completeness includes its conclusions among the items of this report. No attempt has been made to make this exhaustive, but he hopes that it may serve as a basis for further discussion in the committee when other members shall have been appointed.

1. Your committee thinks it impossible to submit a complete form to cover all phases of all engineering contracts, but a work of much value can be done by adopting some general principles and formulating them so that they may be made a part of substantially every contract.

2. Every condition of whatsoever character by which the parties are to be bound should be submitted to bidders as a part of the specifications on which they bid. The contract to be signed should be annexed to the specifications. In this way the bidder is not liable to be surprised by new conditions appearing in the contract submitted for his signature after his bid is made and accepted.

3. The greatest vice of contracts is uncertainty. In adopting any form of contract or specifications, every effort should be made to secure exactness of definition of the rights and duties of both parties.

4. Recognizing the impossibility of foreseeing every emergency, some authority must be devised for the determination of either unexpected physical conditions or unforeseen ambiguities in the contract.

5. The first requisite to this is promptness, so that the work may proceed. This doubtless requires that all disputed questions shall be primarily settled by the engineer present on the work.

6. But, while the engineer is the best fitted person to reach a prompt decision, his relation to the owner unfits him for an impartial decision. There must, therefore, be some provision for an appeal to an impartial tribunal, and final settlement of all disputes by it.

7. Disputes should, as far as possible, be settled as the contract progresses, so that the parties can know how they stand. To this end, all matters of dispute should be reduced promptly to writing and all appeals from the engineer's decisions should be promptly taken.

8. Each party should assume full responsibility for his own share of the contract.

9. This involves the assumption by the owner of responsibility for the local conditions and for the borings or other explorations of the site. The contractor should bid on guaranteed local conditions, with an increase or reduction of price for variations from these. The locality belongs to the owner and the contractor should not be obliged to gamble on it.

10. The principle also requires that a contract should not both provide the exact details of construction and guarantee the result. If the contractor is to do the work according to exact plans furnished him by the owner, the owner should take the responsibility for the result. If the contractor guarantees the result, he should be free to adopt his own methods of construction.

11. The contractor, especially when bound by a time limit, should be given the utmost freedom as to the order and manner of doing the prescribed work.

12. Definite provision should be made for the assertion in writing of demands made by either party varying from the normal contract price. The contractor should give prompt notice of a claim for extras and the owner of a claim for a decrease or for the assessment of damages.

13. Some rule should be prescribed for the owner's protection in case of delay on the contractor's part, either by a right

to annul the contract, or to take over the work in whole or in part, or to deduct actual or liquidated damages. The subject is one of great difficulty and needs most careful consideration.

14. The contractor should be protected from loss by delay of the owner or the owner's other contractors and provision made for settling such losses, without suit, where possible.

15. What is the proper amount of retained percentages? What should be the maximum part of the contract price to be retained until final payment? Differences of opinion should be adjusted and a uniform rule adopted.

16. Material men insist that the contract bond should provide for payment for materials and labor. This leads to greater security to the material men and consequently lower prices. But it is an unnecessary cost to contractors of established credit. This subject needs the views of both sides.

17. Some contractors and engineers maintain that the contract conditions should be as brief as possible. Your committee believes that all subjects which experience has shown may produce conflict should be definitely disposed of by the provisions fixed in the contract, even if this extends its length.

18. After every effort has been made to avoid all uncertainty in the contract and to settle disputes as they arise, some honest differences of opinion as to the rights of the parties may persist to the end of the contract. The final settlement of uncontested matters should be made without prejudice to the right of the contractor to recover disputed claims in the courts. It has, unfortunately, become too common to declare that on final payment the contractor shall sign a release of all claims arising out of the contract. This is a one-sided and dishonest provision. When payment is earned by a fulfillment of the contract, it ought not to be denied because the contractor believes that he is entitled to more, nor should he be forced by necessity to waive access to the courts to correct wrongs done him in the course of the contract.

Your committee might extend this discussion much farther, but believes that enough has been said to show the difficulties

of the subject and the need of full consideration. Many forms of contracts have been drawn by various authorities. The standard forms of the Royal Institute of British Architects and of the American Institute of Architects have much to commend them. One general remark may be made in regard to nearly all such forms—that they have been generally prepared by persons representing owners, such as architects and engineers, and that, however fair their intention, the inevitable tendency has been to protect the owner's rights at the cost of the contractor's.

While this is in name a society of Engineering Contractors, it numbers also many engineers in its membership. It is, therefore, singularly able to formulate a contract which will take into consideration the rights both of the owners and contractors.

Your committee would add that a committee was appointed by the President of the United States some years ago to formulate a uniform contract for government work. Employees of the government from various contracting and legal bureaus made up the committee. Their report was made in December, 1911, but it is a remarkable fact that careful inquiry by your committee has failed to find where this report now is filed. Its contents would probably prove valuable to the present inquiry.

Wm. B. KING.  
Chairman.



REPORT OF COMMITTEE "C" GENERAL COMMITTEE  
ON STANDARD SPECIFICATIONS FOR  
CONSTRUCTION WORK.

Gentlemen of the Society, I beg to submit my report as General Chairman of the C Committee on Standard Specifications for Construction Work. Inasmuch as the committee have been so recently formed, and the work of the committee and its sub-committee is so largely dependent upon correspondence, it has been impossible to submit anything more than a progress report at this time. Communications have been received from the Chairmen of several sub-committees and the following report is based upon said sub-committees as appointed, with comments or reports from the various Chairmen. You will note that reports have not been received from all of these sub-committees, but there is evidence of sufficient interest to justify us in the belief that a year from now, at our next Annual Meeting, we will have information to present that will be of a permanent and valuable character.

*C-7 Highway Construction.* F. B. Bosch, Chairman, Commonwealth Building, Harrisburg, Pa. The Chairman, Mr. Bosch, suggests that we give a careful study to the specifications already prepared by the other Engineering Societies and then suggest any modifications that we, in our judgment find advisable.

*C-9 Railway Construction.* V. M. Roberts, Chairman, Goderich, Ont., Canada. The Chairman, Mr. Roberts, suggests that we carefully consider specifications as prepared by the American Railway Engineering Maintenance of Way Association and recommend the adoption with any modifications that may be suggested. The Chairman of this committee signifies a disposition to work closely in harmony with the work of the Society to the end of monthly reports.

*C-10 Railway Maintenance.* E. T. Howson, Chairman, 417 S. Dearborn Street, Chicago, Ill. Mr. E. T. Howson, Chairman, suggests that the sub-committee on "Standard Specifications for Railway Maintenance" be discontinued for reasons specifically set forth in his communication of the 7th inst. Your General Chairman does not agree with Mr. Howson, believing that it is entirely practicable to outline a set of specifications for railway maintenance work whether the work is done by contract or by company forces. There is no doubt in this particular committee that we can profit by the work of the various Railway and Engineering Maintenance Associations.

*C-11 Bridges.* Daniel B. Luten, Chairman, Terminal Building, Indianapolis, Indiana. This committee is now being organized, acknowledgments having been received from three out of five members suggested. The suggestion is made that each member of the committee forward his ideas of a complete specification to the end that the committee may report a final specification for approval. This work will require considerable time, but there is no doubt of the sincere interest on the part of the committee.

*C-13 Dams.* Edward Wegmann, Park Row Building, New York. The Chairman, Mr. Wegmann, reports his inability to make a report at this time and states that the field is so large that only a part of same can be covered in one year.

*C-14 Harbor Improvements.* Henry F. Alexander, Chairman, P. O. Box 312, Lorain, Ohio. The Chairman suggests that inasmuch as the committee is made up of members widely separated geographically, that suggestions be received from each member of the committee to the end that standard specifications may be prepared, that the time is so short that such a procedure cannot be obtained in time for report at this meeting.

Uniformly throughout the above reports of sub-committees you will see that there is a general recognition of the fact that the time is too short to give any definite report at this meeting. Perhaps there may have been error in the division and sub-division of committee work, but even though such may be the case, we should accept same and give our best efforts to accomplish results along the line as laid out for us. We cannot expect to arrive to perfectness within the short time that our Society has been in existence, and it is only by the combined efforts of our membership that we can accomplish anything. I feel sure that I speak for the management of the Society when I say that, if in the course of time it develops that the sub-divisions of these committees should be changed as a result of the work of the membership, revisions will be made; in other words, the management can only suggest that which in their judgment is the best way in which the work of the Society should be conducted. Suggestions are always in order and each individual member is entitled to a hearing. We have a ground plan upon which to work, and I urge upon you, each individual member, to co-operate to the end that we may obtain valuable results. I feel sure that the President and Secretary, the Board of Directors and the General Committees have conscientiously endeavored to serve the best interests of the Society. If you have any criticisms to make, let them be known. We may reasonably expect to profit by the work of our kindred engineering and architectural organizations, but there is a peculiar and particular value in the opinion of the members of our Engineering-Contracting Organization which should be recognized in the drawing up of specifications by these other organizations because of the intimate experience and specialized association of our members with actual work.

We should insist that all specifications for construction work be passed upon by this Society, not because of the Society, but because of the personnel of the membership.

DEWITT MOORE,  
Chairman.

## REPORT OF SUB-COMMITTEE C-10 ON RAILWAY MAINTENANCE.

Referring further to your letter of January 1st and my reply of the 2nd since receiving notification of my appointment as Chairman of Sub-Committee C-10 "STANDARD SPECIFICATIONS FOR RAILWAY MAINTENANCE," I have been unable to consult with other members of the sub-committee and submit the following as representing my personal opinion only, for consideration at the annual meeting of the Association.

Because of the very wide variety of work included in the maintenance of railway track and structures, it is practically impossible to draw up any set or sets of specifications which will cover the various problems with sufficient detail to be of value. The contracting of maintenance work has been tried to such a very limited extent in this country that no precedents for the preparation of such specifications are available and the Association would only weaken itself by preparing specifications for which there is no demand.

The contracting of railway maintenance of way work is far different from the contracting of new construction work and possesses several serious objections. In the first place, a large part of the work of a railway maintenance force is preventative rather than remedial and the thoroughness and efficiency of such work depends on the care and judgment of the foreman. The routine track inspection, testing of signal batteries, trimming of trees along a telegraph line before they actually interfere with the service, removing of brush from above a bridge, and similar duties are fully as important as the renewal of ties and rail, overcoming a signal failure or replacing of defective stringers on a bridge. Work of the first kind cannot be paid for on any basis other than on a day basis, as is now done. The contracting of such work, and in that way dividing the responsibility, will increase rather than decrease the hazards of railway travel.

The business of a railway is to manufacture and sell transportation, both passenger and freight, and safety is the fore-

most consideration. The object of a contractor is not to move trains, but to accomplish a piece of work as rapidly as possible consistent with thoroughness. If these interests conflict, as they cannot help but do in maintenance work, it is only natural that the contractor will take chances in delaying trains with the possibility of accident to avoid delay to his work. Again, the amount of traffic will fluctuate and the contractor bidding on work subject to traffic delays, must, for his own protection, bid on the basis of the maximum delay to be expected, while a railway doing its own work will take the delays as they come knowing that while they increase the cost of construction they also increase the gross revenue of the road.

Again, railways can only let work in small contracts to effect any economy. Contracts sufficiently large to warrant contractors to compete for them would result in organizations similar to those now employed by the railways with the difficulties of securing labor and supervision that the railways now meet.

The maintenance department of the average railway is called upon to handle all kinds of emergency work from clearing up wrecks to breaking strikes in freight houses, etc. The breaking up of this organization will seriously cripple them in such emergencies.

For these and other reasons, I respectfully suggest that the subject "Standard Specifications for Railway Maintenance" be discontinued, or if the Association should desire to continue it, that they outline definitely the work it is desired to cover.

Yours very truly,

E. T. Howson,  
Chairman.



## REPORT OF SUB-COMMITTEE C-16 ON HYDRO-ELECTRIC CONSTRUCTION.

As Chairman of the Committee on Standard Specifications for Construction Work, you should receive at this time at least a preliminary report from the Chairmen of the various Sub-Committees comprising the general committee as above cited, hence I, as Chairman of Committee 16, Hydro-Electric Construction, have the pleasure to report progress as follows:

While it doubtless would appear offhand as impracticable to recommend any character of specifications that might become a standard for construction work of this general nature, wherein one finds that most every Hydro-Electric Installation differs from its "kin" achievement in so many important particulars, that no two of them would seem sufficiently related to even permit being characterized as having a family connection, still, after giving the question a close analysis, I am of the opinion that much good can come from an effort in that direction, which to some might appear impossible for realization.

Accordingly, I have written a number of my old associates, not at present members of our Society, for their specifications and data of completed Hydro-Electric Developments. I shall probably secure a number of these, and with the addition of my own collection, I shall have a starting point to work from.

While I fully appreciate that each projected Hydro-Electric Development involves engineering problems more or less new in practice, and probably in detail differing materially from other similar installations, there is, on the other hand, much matter in common that can be standardized so as to represent a basic specification, elaborations of which may naturally be had and expected.

You will receive a later progress report as soon as I am in a position to furnish the result of my analysis of the numerous data I expect to shortly have in my possession.

Respectfully submitted,

E. H. ABADIE,  
Chairman.

## REPORT OF SUB-COMMITTEE C-19 ON SEWERAGE.

At the annual meeting some of us had the pleasure of meeting and exchanging ideas on our work with the result that it was decided that, as the subject allotted to us is so broad, the best plan would be for us all to formulate a skeleton form of what we considered a complete set of SEWER SPECIFICATIONS. Then send this "dummy" to all the members of the committee and have each one make any additions thereto on a separate sheet to be attached thereto, and for each member to address to the Chairman any additional remarks or ideas concerning the subject.

The writer proposed to send out the first set modeled after the work of another committee in one of our other societies with such corrections that seemed to him to fit the case. After this skeleton had been seen and commented upon by all the members it would be taken and revised; using the suggestions as made by the members; it would then be forwarded around for final remarks and correction after which it would be ready for use.

Upon the final completion of the finished "dummy" it would be forwarded to the Society with our recommendations that specifications to be complete should be drawn in accordance with our standard form. Then if the Society thought wise they could return it to the committee with the request that we draw up three or four sets of specifications upon the following—Sanitary Pipe Sewers, Sanitary Monolithic Concrete, Brick, Masonry, Concrete Pipe Sewers, etc., until the entire ground is covered.

By agreeing upon the exact form that we want to use we are doing much, for on adoption of the completed form, the work can then be divided up among the committee and each one given the subject matter with which he is most familiar. In this manner, those of us who had the hope that much duplication and waste of time will be saved, and that each one will then be working with a definite purpose in view.

Hoping that the above will meet with your approval, I remain,

Very truly yours,

GEO. L. WATSON,

Chairman.

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The complete instrument designed to govern every detail in the execution of contracts for sewer construction, should contain the following:

#### A NOTICE TO INTENDING BIDDERS.

Such a notice should state clearly:

Time and place at which bids will be received.

Location and extent of the work.

Time allowed for the execution of the contract.

Amount of security required.

Manner in which bid shall be presented and its contents.

General cautions in regard to preparation of bid and execution of work.

Amount of money available for the work.

Other information for the assistance of the contractor in the preparation of his bid.

#### CONTRACT OR AGREEMENT PROPER.

The form shall contain, in addition to the agreement, bonds, official signatures and acknowledgments of the same, and official designations of the fund from which the expense is to be met, with guarantee from the proper legal officer that same is correct, the following:

A certified copy of the official action granting authority to execute such a contract.

A description of the parties to the contract and of the officials or the employees under whose supervision it is to be executed.

A statement covering in detail all the work to be done and the prices bid for the same.

A definition of the authority and duties of the engineer and assistants in control of the work as the representatives of the city or party of the first part.

A definition of the rights of the contracting authority in determining the time of commencement, supervision of work, methods of procedure, force to be employed, etc.

A definition of the contractor's obligations in executing the work in accordance with specification requirements and the direction of the supervising authority, and in maintaining same, in the protection of property from damage, the payment for labor and materials, the completion within contract time, manner and time of payment, liquidated damages and bonus for delay beyond contract time or completion before, etc.

Method of procedure in modifying contract.

Clauses relating to liens, claims, damages, guarantees, assignments, etc.

Enumeration of the provisions of laws and ordinances especially applicable to municipal contract work which must be observed.

Other clauses of special or local application.

## SPECIFICATIONS.

Following a general description of the work embraced in the contract and the limits within which it is to be done, the limits within which it may be located (specifically defined), manner and times of fixing grades by the engineer, manner in which measurements shall be made, etc.:

A description in detail of all labor to be performed, both preliminary and subsequent to the emplacement of the sewer structure, and the manner of its performance.

## EXCAVATION OF TRENCHES.

Dimensions of the various sizes of sewers and lengths to be opened at one time.

Shoring and bracing.

Pumping, bailing and draining.

Foundations, their preparation to receive the sewer.

Disposition of excavated material.

Provisions for the maintenance of street traffic while work is under way.

Removal of pavements and disposition of paving material.

Protection and support of other structures, pipes, conduits, etc.

### REFILLING OF TRENCHES.

Character of material to be used especially about sewer.

Manner of placing, ramming, puddling, flooding, etc.

Disposition of surplus, deficiency, how met.

### EMBANKMENT.

Dimensions.

Character of materials, how placed and compacted.

Provisions for traffic through intersecting streets.

### REPLACING OF STREET SURFACES.

Unpaved streets, surface to be restored, maintenance period.

Pavements, curbs and sidewalks out of guarantee, how restored, maintenance period.

Pavements, etc., under guarantee, how restored.

A description in detail of all materials to be employed, their quality as shown by the tests and specifications written by the sub-committees appointed by this Society for that purpose, and their proper manipulation to produce the finished structure.

### CEMENT AND MORTAR.

Cement, quality, standard tests to be met.

Cement, how delivered and stored.

Cement, measurement of volume.

Mortar, measurement and proportion of ingredients.

Mortar, method of mixing.

Mortar, character of sand, tests of sand, etc.

Mortar, amount of water.

### CONCRETE.

Size or character of stone or gravel, specifying which to be used.

Size and uniformity of sand grains, amount of allowable loam by volume.

Proportions of ingredients to be used in the mixture.

Methods of mixing, placing and surfacing.

Moulds and forms.

#### BRICK MASONRY.

Quality and size of bricks to be used.

Manner in which they are to be laid and protected from injury. (Inverts, arches, haunch walls, manholes and catch basins, spurs and branches.)

#### STONE MASONRY.

Quality and dimensions of stones. Rubble, ashlar and dry masonry, coping stones, basin heads, etc.

How laid to produce finished walls and structures.

#### STEEL AND IRON.

Rods for reinforcement,

Structural shapes,

Quality, dimensions, tests, etc.

Expanded metal, wire mesh, etc.

How placed in the finished structure.

Spikes used in platforms, grillages, cribs, etc. Quality, dimensions, etc.

Cast-iron, quality and tests. Conformity to place.

#### SEWER PIPE.

Sub-Committee reports on this.

#### JOINTS.

Cement, cement grout, cement and pine tar, asphaltum, pitch, sulphur, patented jointing compounds. Where each different kind of joint shall be used and how made. Allowances to be made for special joints if used, and how much.

#### BEARING PILES.

Kinds and quality of timber.

Dimensions.

How driven.

How measured and paid for.

**FOUNDATION TIMBER.**

Kinds and quality of timber.  
Dimensions as shown on plan.  
How laid and secured.

**SHEATHING AND BRACING TIMBER—MANNER OF PLACING.**

To remain in the work. Kind, quality, dimensions, etc.  
To be withdrawn. Kind, quality, dimensions, etc.

**SEWER CONNECTIONS.**

Manner and time of connecting house drains.  
Connections intersected to be reconnected.  
Flow of old sewers—how cared for.  
Method of making all connections.

**HOUSE CONNECTION DRAINS.**

Spur pipe to receive house connection drains. Spacing and size. How laid.  
Stand pipes on deep sewers.  
Cast-iron pipe for house connection drains where necessary, how laid, quality, etc.

**MANHOLES.**

Concrete, brick, how built, dimensions, etc.  
Manhole heads and covers, buckets, steps. Standard plan, weights, dimensions, etc. Quality of iron, inspection.

**SEWER BASINS OR INLETS.**

Standard plan.  
Excavation, dimensions, how made.  
Heads and gratings or pans.  
Traps.  
Culverts, dimensions, how laid and connected to same, etc.  
Restoration of curb, sidewalk and pavement after construction.

**SPECIAL.**

Committeemen will here add such additional sheets or matter that they desire to add, making references to sub-head under which same is to come.

## REPORT OF SUB-COMMITTEE C-20 ON TUNNELS.

Replying to yours of the 1st inst.—through Mr. Wemlinger—I would suggest that the members of Committee C-20 procure as many copies of Tunnel Specifications as possible, and pick out such parts as are good—always bearing in mind that he who writes specifications with minimum ambiguity and leaves out all clauses that tend to create trouble between the engineer and contractor—is the one, and only one, that will relieve the bitter feeling between the two professions.

When specifications are written embodying moral obligations (covered sufficiently by law) and the two professions, Engineering and Contracting, adhere strictly to those obligations, then, and only then, can the Contractor and Engineer secure justice each from the other. Our specifications should be written in such a way that they will lead men—not drive them—to be honest.

I would suggest that each member be as original as possible and that he does not put any clause in specifications that can not be carried out in practice. Points of difference should be settled by representatives from all parties concerned—never by the Chief Engineer of any company.

I think it best for each member to write a complete set of Tunnel Specifications and send me a copy—I will return same to them with a copy of mine which will embody all the main points in theirs. I will expect them to criticise freely and return to me for final revision. A copy of the specifications will then be sent them and if no corrections are indicated, I will forward same to you for your approval.

I will be glad to receive any suggestions from you in regard to the committee. I am very sorry that I can not attend meeting.

Very truly yours,

B. M. LANGHEAD.

Chairman.

## REPORT OF SUB-COMMITTEE D-1 ON COST ANALYSIS.

At the Annual Meeting of the Society January, 1910, the speaker submitted a report on Cost Analysis which was in a sense a personal paper. In January, 1911, the same subject matter was continued under a brief report by the speaker as Chairman of the Committee. The Committee Work of our Society is now assuming a well defined system, and in order that we may continue in the year 1913 with some definite field your committee reports as follows:

1. Referring to report of committee of 1910 reference is made to the suggested chart showing a summary of the report at that time.

The following charted summary presents in condensed form the writer's idea of Cost Analysis as applied to construction work:

COST	1. MATERIAL	1. Actually entering into the work divided by items of different character. <table style="margin-left: 20px;"> <tr><td>1. Actual Quantities</td></tr> <tr><td>2. F. O. B. Price</td></tr> <tr><td>3. Waste</td></tr> </table>	1. Actual Quantities	2. F. O. B. Price	3. Waste														
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2. F. O. B. Price																			
3. Waste																			
2. LABOR	2. Accessory or Incidental. <table style="margin-left: 20px;"> <tr><td>1. Quantity</td></tr> <tr><td>2. Price</td></tr> <tr><td>3. Salvage and Loss</td></tr> </table> 3. Labor <table style="margin-left: 20px;"> <tr><td>1. Delivery to Job</td></tr> <tr><td>2. Itemized by Sections of varying character.</td></tr> <tr><td>3. Itemized by kind of work done (Gen. Div.)</td></tr> <tr><td>3. Special divisions of pay work</td></tr> </table> 1. Direct or Productive. <table style="margin-left: 20px;"> <tr><td>1. On Job....</td></tr> <tr><td>2. Repairs</td></tr> <tr><td>3. Incidentals</td></tr> </table> 2. Indirect or Nonproductive. To be proportioned over the various items of Productive Labor. <table style="margin-left: 20px;"> <tr><td>1. Material Delivery (A material charge)</td></tr> <tr><td>2. General Supervision</td></tr> </table> 3. Yards or Shop, Direct Labor. <table style="margin-left: 20px;"> <tr><td>1. Bond and Insurance</td></tr> <tr><td>2. Expense</td></tr> <tr><td>3. Fittings and Repairs</td></tr> <tr><td>4. Fuel and Oil</td></tr> <tr><td>5. Specials</td></tr> <tr><td>6. Commissary (Where required)</td></tr> </table>	1. Quantity	2. Price	3. Salvage and Loss	1. Delivery to Job	2. Itemized by Sections of varying character.	3. Itemized by kind of work done (Gen. Div.)	3. Special divisions of pay work	1. On Job....	2. Repairs	3. Incidentals	1. Material Delivery (A material charge)	2. General Supervision	1. Bond and Insurance	2. Expense	3. Fittings and Repairs	4. Fuel and Oil	5. Specials	6. Commissary (Where required)
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6. Commissary (Where required)																			
3. GENERAL CHARGES To be proportioned over cost of material or labor, or their sum.	1. Direct to Job. <table style="margin-left: 20px;"> <tr><td>1. Petty Tools</td></tr> <tr><td>2. Tools and Machinery</td></tr> <tr><td>3. Yard and Shops, Payroll and expense of general character</td></tr> <tr><td>4. General Office Payroll and expense</td></tr> </table> 2. Indirect to Job. <table style="margin-left: 20px;"> <tr><td>1. Petty Tools</td></tr> <tr><td>2. Tools and Machinery</td></tr> <tr><td>3. Yard and Shops, Payroll and expense of general character</td></tr> <tr><td>4. General Office Payroll and expense</td></tr> </table>	1. Petty Tools	2. Tools and Machinery	3. Yard and Shops, Payroll and expense of general character	4. General Office Payroll and expense	1. Petty Tools	2. Tools and Machinery	3. Yard and Shops, Payroll and expense of general character	4. General Office Payroll and expense										
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All of the foregoing is presented to the Society as being merely suggestions to our Committee. The subject is a tremendous one, and it is expected and hoped that such a storm of discussion will follow that the Committee may have the material for a report in 1911 which will put us all on the right track.

This division of costs was suggested only as a form upon which the Committee might work, but inasmuch as no definite action has been taken it is maintained as being the only definite basis for criticism and discussion.

In January, 1911, this report was continued and we quote verbatim as follows:

"At the last Annual Meeting of this Society the Chairman of this Committee submitted a personal paper on the subject of Cost Analysis, which was offered as suggestion for Committee work during the year. So far in the work of this Committee no reason has been found for changing in any material or general way the suggestions so made. Naturally, in individual work, minor changes may be applicable and individual ideas incorporated, but in general any uniform system of Cost Analysis can be obtained only by the working out of a standard method of distribution, so that when one job is analyzed and compared with another, and where possibly the individual making the analysis has no familiarity with either, or only one, there may be a direct method of comparison and analysis.

Even minor changes, due to the personal ideas of the individual members of this Society, will throw any such comparisons of analysis out of balance with the work of those who are following such a system. Many individual preferences may have good reason for existence, and, in the opinion of your Committee, it is only by receiving the suggestions of our entire membership and thoroughly discussing each and every classification and distribution, that we can possibly advance along this line, and secure a composite picture of all these ideas in the form of a chart which we can adapt, giving as a basis upon which your Committee may work until we accomplish results.

The work of this Committee has been questioned by some who do not understand the distinction between Cost Keeping and Cost Analysis. It is not within the province of this Committee to define Cost Keeping only so far as it is necessary in studying Cost Analysis, but in the beginning of our second year's work we do suggest that a well-understood definition of Cost Analysis be adopted in order that there may be a clear understanding and as little confusion as possible. We therefore suggest for the consideration of the Society the following definitions:

First—Cost Analysis is that executive mapping out of new work; supervision of such work, and compilation of the records secured through Cost Keeping in order to secure comparative values.

Second—Cost Analysis is the study of the data obtained by Cost Keeping whereby the reasons for the results are determined.

Third—Cost Analysis is the executive department of contract work for the purpose of proper supervision and securing of intelligent records, whereby experience is fortified for future reference.

We are not entirely satisfied with any of these definitions.

Cost Analysis is not concerned with what work costs, but is concerned in ascertaining why it costs as much as it did, and whether it is above or below the average, and if so, why? Cost Keeping states certain absolute facts as being such because they are records. Cost Analysis goes one step further and states why the work costs a certain sum, and what could be reasonably expected under different circumstances. Cost Analysis begins at the time estimates on new work are prepared, superintends the adoption of cost-keeping system in harmony with the estimate, watches the work during progress for any and all abnormal conditions, segregating same and finally analyzes the records.

Committee D (Cost Data) includes two sub-committees, viz: D-1 and D-2, "Cost Analysis" and "Cost Accounting." In line with the previous reports just mentioned, it has been the purpose of the writer to work entirely in harmony with the object of the Society. Mr. H. P. Gillette, General Chairman of Committee D has suggested that this sub-committee formulate a series of ques-

tions to be submitted to the membership at large. Mr. Byers of our committee suggests that we adopt a definite program or procedure which will be submitted to each member of the committee, so that we may all be working towards a definite report at the next Annual Meeting.

Mr. Thompson agrees with the Chairman of this committee that there is an opportunity for an over-lapping in the work of the various committees and he suggests that there be a meeting of the various committees to divide the work so that such may not be the case. In order to bring out clearly Mr. Thompson's views on this subject, I beg to submit verbatim quotation from his letter of the 4th inst. "Cost Analysis may be considered in two entirely distinct ways; in one way as supplementary to cost accounting as indicating the divisions into which costs should be divided in regular cost keeping, such as is done by an ordinary timekeeper, and on the other hand, the entirely distinct operation of thoroughly analyzing a job by time study so as to obtain accurate unit times, which may be used for combining into times for estimating costs, or times for setting tasks. As a sub-committee under the general committee on Cost Data, it would appear that the former meaning of the term was intended."

"I am not interested specially in this phase of the subject, but I am interested in Cost Analysis or time study, as I would term it, as applied to scientific methods of management. I should be in favor of taking the stand that our committee consider the question of the latter part of the subject, and in so doing it would make the committee really an adjunct of the Committee on Scientific Management, rather than under Committee D, but I see no objection in taking this view of the point. I very much question whether the committee can make any report at the January meeting, unless it be in the line of suggesting the course that the committee prefers to pursue during the coming year. To state even this in detail or with much definiteness would require considerable study and conference."

There is a large field of work within the province of this committee provided the outline of work can be so adjusted so as not to conflict with the General Committee on Cost Data and

the Sub-Committee on Cost Accounting. In the writer's opinion Cost Analysis is an intermediate between Cost Accounting and Scientific Management and is so closely related thereto that, unless there is a very intimate relationship between these various committees, confusion is bound to result. Therefore, we should have some general instructions or a line of demarcation between the work of the committees established. Otherwise, we cannot proceed with any degree of satisfaction.

DEWITT MOORE,  
Chairman.



## REPORT OF SUB-COMMITTEE D-2 ON COST ACCOUNTING.

The Committee on Cost Accounting (D-2) is not prepared to make a formal report at the annual meeting on January 14, 1913, but desire to go on record as having started on their work in earnest and driven the opening wedge.

The committee at this time reports "Progress."

For the Committee,

HOWARD J. COLE,  
Chairman.

## REPORT OF SUB-COMMITTEE F-6 ON GENERAL LEGISLATION.

The Chairman of this Sub-Committee has not yet been advised of any meeting of the general committee or the names of any other members of the sub-committee, nor have any matters of general legislation been referred to him for consideration. He, therefore, has no report of action to make to the Association.

Wm. B. KING,  
Chairman.

## REPORT OF COMMITTEE "G" ON ARBITRATION.

Permit me, as Chairman of the Committee on Arbitration, to make the following report to you as Chairman of the General Advisory Committee.

My understanding of the functions of my committee is that it shall recommend a form, plan or scheme of Arbitration, which, if possible, shall not conflict with the rights of the Courts and which shall be such as to become a part of contracts for the purpose of avoiding appeal to the Courts through an action at law for protection of either parties to the contract.

The jealousy of the Courts against a usurpation of their rights has heretofore rendered few Arbitration clauses in contracts binding when placed in force where either party thereto objected to the decision of the Arbitrator and appealed to the Courts. Hence, some means must be found to meet not only the rights of the parties to the contract, granting therein proper protection in each instance, but the legal objection must be met and the Court's interference prevented if any large amount of good is to be forthcoming from the adoption of Arbitration Clauses in Engineering Contracts.

I am, therefore, required to pursue the method of searching the legal opinions and authorities on this question, and from that data study the question. With this information, added to my experience in several cases of like import, I feel that a way can be found out of which a clause can be constructed for embodiment in contracts that will give what is sought by the insertion of an Arbitration Clause.

I also understand that it is not the function of the Committee on Arbitration to act in an official capacity and represent the Society as its Arbitrator on cases in dispute where one of its members is a party to the dispute when such dispute is submitted to the Society for determination, though this has been suggested as one of the functions of the Committee on Arbitration; on this point I should like to have more complete instructions.

Respectfully submitted,

E. H. ABADIE,

Chairman.

# AMERICAN SOCIETY OF ENGINEERING CONTRACTORS

11 BROADWAY, NEW YORK, U. S. A.

PAPER No. 49.

## LEGAL QUESTIONS INVOLVED IN THE PROPOSED AMENDMENT TO THE GENERAL MUNICIPAL LAW OF NEW YORK†

BY

WILLIAM M. BOWMAN.\*

(Member of the Society.)

Mr. President, Gentlemen of the Society and Guests—When I was asked to prepare a paper for this Society, I was permitted to choose my own subject, and as I had written a series of papers for the "Brickbuilder," entitled, "Legal Hints for Architects," I thought I would use that as a basis for a paper entitled, "Legal Hints to Contractors." After I had started the paper your Secretary suggested that the Society was specially interested in the proposed amendment to the statute law, covering Major Gillette's suggestions in his paper on "Competition in Public Contracts" and hence the members of the Society would consider it a special favor if I would discuss and legally criticise those amendments. I told him I would do so and thus it is that the proper title for to-day's paper is "Legal Questions involved in the Proposed Amendment to the General Municipal Law of New York."

The many and various requirements and restrictions pertaining to public contracts in the State of New York are not generally known. This is chiefly due to the fact that such requirements and restrictions are not to be found in any single legislative act, but they are scattered widely, and under titles with little or no significance as to their contents. For example: Who would think of looking at the lien law to ascertain the requirements regarding bonds for the performance of public contracts; yet, that is the act at present covering that subject. While it is natural that there should be considerable uniformity in the

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†The proposed amendment which was published in the May 1912 issue of The Journal, is reproduced at the end of this paper for the convenience of the reader. In order to avoid confusion the original paging is used.

various acts pertaining to public contracts, still it is surprising to find the ranges which are covered by the different provisions, and also the differences in various court interpretations.

In New York State public contracts are governed and controlled among other things by the United States and our State constitutions, the County Law, the General Municipal Law, the General City Law, the Public Buildings Law, the Second-Class City Law, the State Boards and Commissions Law, the State Finance Law, the Town Law and Village Law. There are also laws set forth under subjective titles such as The Canal Law, Canal Improvements, Canal Terminals, Drainage Law, Education Law, Highway Laws, Highways, Insanity Law, Military Law, Poor Law, Prison Law, Public Health Law, Rapid Transit, State Charities Law and State Printing Law. Many important provisions and matters of serious consequence, in this connection, are found under such titles as the Labor Law, Lien Law and Penal Law.

In addition to the foregoing, public contracts are also subject to the special rules and regulations of each particular municipal corporation. For example: Contracts of the City of New York must comply with the provisions of the Charter of the City of New York, and the Building and Sanitary Codes. The object of this paper is to briefly consider how the proposed amendment to the General Municipal Law, as published in the May 1912, issue of the Society Journal, compare with the present laws, supporting the proposed amendment, if possible, by present requirements, making suggestions for changes in the amendment, and generally to try and foresee some of the probable results should our amendment become the law.

#### GENERAL CONSIDERATION.

The General Municipal Law, of the State of New York, which it is proposed to amend, is an outgrowth and consolidation of some general laws started in 1840. As the Act stands to-day it affects chiefly such objects as municipal finances and reports, negligence and malfeasance of public officials, taxpayers' remedies, certain powers, limitations and liabilities, trusts for parks and libraries, regulation of the use of bicycle and similar vehicles.

establishment of a public general hospital and colonies for inebriates, etc. The only sections thereof relating to public contracts are Sections 86 and 88.

Section 86, to which the proposed amendment is made, requires that "every contract made or awarded by any municipal corporation or any public department or official thereof" shall contain a clause against assignment without the previous written consent of the contracting department or official, power being granted in cases of non-compliance to revoke and annul such public contract and forfeit all moneys earned except sufficient to pay employees. This rule is not applicable in cases of statutory assignments, for the benefit of creditors.

The other contract section found under this act is very new, being Chapter 277 of the Laws of 1912, which requires every official board, department, commission or commissions charged with the duty of preparing specifications or awarding or entering into contracts for the erection, construction or alteration of buildings, when the entire cost of such work shall exceed one thousand dollars; to prepare separate specification for:—(1) Plumbing and gas-fitting, (2) steam-heating, hot-water and ventilating apparatus. Such specifications must be drawn to permit separate and independent bidding upon each of the classes of work enumerated, and such work shall be contracted separately to responsible and reliable persons, firms or corporations. This does not prevent such work being done by regular employees or inmates of public institutions.

The very first question which is suggested by our proposed amendment, and one of the most important is:—What is the extent of its application? The amendment states the application to be for "Municipalities, boards, commissions and other bodies charged with the expenditure of public money." The act to be amended by Chapter 769, laws of 1911, defines the term "Municipal corporation" as applicable to a city, county, village, school district, sewer district, water district, lighting district or any other district or territory authorized by law to issue bonds.

It will be immediately noted that the State itself, its departments, legislative commissions, or boards such as are always

formed to construct such work as the Barge Canal, Canal Terminals, Rapid Transit, etc., are not specified in said definition. Exclusive of this definition, the decisions of this State hold that the State is not a municipal corporation. With these considerations and what they suggest before us, will our amendment cover contracts of the State or its Departments? Undoubtedly there will be differences of opinion on this subject, but there are at least three good reasons why our proposed amendment would be construed as applicable only to municipal corporations, its departments, boards and commissions:—First, Because the amendment is made to the General Municipal Law; Second, Because Section 88, of the present Act, pertaining to plumbing and steam-heating, was enacted also under the title "State Finance Law," chapter 514, Section 50 of the Laws of 1912, so there might be no question as to its application to State work, its departments, boards and commissions. Third:—Because of the strict rules of interpretation which the courts usually apply in cases of such a revolutionary statute as this.

The losses to the public, as stated by Major Gillette in his paper published in the February, 1912, Journal, are specially to be found in the big contracts, such as our present Barge Canal work, or the Canal Terminals. The chances of loss in these contracts for millions are of course infinitely greater than the loss in the few thousands spent annually by all the School districts in the State. This statement requires no discussion, and I cannot conceive any dissent to the proposition that our proposed amendments are intended to and should cover *all public works*.

How shall we remedy this defect, or, at least, this opportunity for serious conflict of opinion? In view of the present condition of our laws, probably the only safe way would be to re-enact our amendments as a portion of the State Finance Law, being sure that it covers not only the State and its departments, but the legislative boards and commissions. Logically it would seem more fitting that the amendment should be made to the Public Buildings Law.

The practical discussion of the proposed law has been so thorough that I will not spend time upon it. My personal experience with the requirements of our New York Laws regarding

estimates, contracts, orders, certificates or audits, combined with the scrutiny and attention of engineers and corporation-counsels, has been, that most of the present requirements and restrictions are strict enough with the contractor and thoroughly protective to the municipal corporation. In the few cases of which I know, the improper and illegal enrichment of contractors has been chiefly due to the lack of enforcing the laws, or to the permitting of some official to act without restriction.

In view of the great number of different statutes which have been mentioned as applicable to public contracts, it is to be expected that there is going to be serious conflict between our proposed amendment and the present statute law. In general this situation is covered by the provision of our proposed amendment which reads, "All laws in conflict with the above are hereby repealed in so far as such conflict may exist." This will take care of most of the conflicts caused by the State legislation. Other inconsistencies may be expected to be overcome by a court decision, that our amendment will have full force and effect, purporting as it does to cover the whole subject. The conflicts which will arise between the proposed amendment and the charters of the various cities, or the rules and regulations of other municipal bodies, will probably be governed by the rule of law that all statutory requirements must be complied with if they can be reconciled, but that charter requirements or analogous rules and regulations must give way to the State Law.

### SEPARATE SECTIONS

86 A.—The requirement that all contracts must be in writing is very general in our present statutes. The requirement that all expenditures exceeding \$100 shall be by contract is only to be found in the Military Law, section six, clause seven. This contract limit of \$100 is very small. The Second-class City Law has a limit of \$250, the Town Law \$300, the Highway Law \$500, while the Insanity Law, the State Charities Law and the Charter of the City of New York limit is \$1,000. Under the present statutes expenditures less than these limits are made pursuant to so-called cash purchases, day labor, special orders, written orders or certificates of necessity. Further consideration of this

restriction will be taken up in the consideration of advertising, under the next section.

The emergency contract provision seems grossly inadequate. An emergency limit of expenditure of \$100 upon some of our municipal work would be serious, and might cause more loss in damages than many years' saving from favored contractors. In the Canal Law there is an exception made to the usual rule, in case of sudden break or breach of the canal during navigation. Similarly, in the Highway Law there is a special provision for extraordinary repairs when any highway or bridge be damaged or destroyed by the elements, or otherwise, and becomes unsafe for public use and travel.

Even the Military Law, which is one of the most strict in its provisions, suspends operation of its requirements in cases of insurrection, tumult, riot, breaches of peace or imminent danger. It contains a still further provision as follows:—"Except that in case of emergency, said commission may cause repairs immediately required to be done, without calling for competition, at an expense not exceeding one thousand dollars in any one instance."

The Second-Class Cities Law provides as follows: "In case of public emergency involving accident or other injuries by which the heating or plumbing of any of the public buildings, or any of the fire or water apparatus shall be disabled, the Commissioner having jurisdiction thereof, shall cause repairs thereto to be made without a letting by contract, upon filing with the Board of Contract and Supply a certificate approved by the Mayor, showing such emergency and necessity for such repairs."

The Insanity Law (Laws of 1911, Chapter 719, Section 51) provides an emergency fund not to exceed \$1,000 quarterly, "for which no minute detailed statement need be made."

The Charter of the City of New York has many emergency clauses wherein various amounts are named. The Commissioner of Public Charities can spend not to exceed \$3,000 in any one month, similarly, the Commissioner of Corrections, \$2,000, and similarly each Park Commissioner \$1,000. The wording of such sections is well shown by Section 675:—"In case of emergency or in the purchase of perishable articles, the

Commissioner may purchase without calling for competition, at a total expense not exceeding three thousand dollars in any one month. The Commissioner shall in the case of each such purchase, enter in a book to be kept for that purpose, a detailed statement of the facts which render purchase by contract impracticable."

The Second-Class Cities Law and the Charter of The City of New York, in addition to the emergency provisions just given, contain provisions for the expenditure of large or unnamed sums of money, to prevent the spread of contagious and infectious diseases or epidemics. Is it proper and necessary that such emergency provisions should be repealed, or rendered null and void, by the inadequate emergency provision in our proposed amendment?

Before leaving this subject it should be pointed out that there is a line of decisions in connection with the Charter requirements for The City of New York, in which it has been held that a sudden emergency may arise in which prompt action is essential to protect life and property, under circumstances which make it impossible to comply with the ordinary charter provisions. These cases, however, are not a safe basis for reliance, by an honest official or by a contractor doing such emergency work, as they are always closely restricted in their application, and recovery for such work depends largely upon the individual opinion of the particular judge before whom the trial of such an action is brought. Our emergency provision in its entirety makes it important for an official to know, "What is an emergency?"

The line of cases last mentioned gives us the probable answer. In one of them the following is said: "An emergency is a sudden and unexpected happening, an unforeseen occurrence or condition, (Cent. Dictionary); for which therefore it cannot be required that the preliminary steps prescribed in Section 419, (Charter of City of New York), shall have been taken." Hence work such as, on the foundation of a green-house which prevented the destruction of the plants by a heavy frost, doing work upon a motor used in exhausting smoke from a rifle range, fixing

torn wires, remedying defective insulation, etc., have each been held to be, "an emergency job."

The Labor Law, Section 3, contains an exception to the eight-hour day restriction in cases of, "extraordinary emergency."

As yet there are no decisions in this State defining this phrase, but it is interesting to note the decision of the Federal Court on the same expression in the Federal Law, wherein they held that it is, "something unforeseen, sudden, unexpected, which would call for immediate action or remedy." For example, protecting work from being destroyed by flood, from injury and threatened destruction, but it was at the same time held that it did not permit the repairing of losses caused by the unexpected event. In the same case it was also held that even when there was a time limit in a contract, and such a scarcity of labor that it was questionable whether the work could be completed on time, if but eight hours were worked per day, yet that it was not an "extraordinary emergency." Thus we see that some care and legal acumen is necessary in deciding whether certain circumstances will create what the law will consider an emergency or not.

Our emergency clause also requires three bids to be obtained. What protection have we for the contractor who is given an emergency order, and after he furnishes the material or labor, finds that through carelessness or in the haste and flurry created by the emergency, the official has failed to get three bids? Of course, this is assuming upon my part that payment would be refused the contractor by the disbursing officer upon the opinion of some severely technical and hair-splitting corporation counsel. A glance at our Section 86F shows that such a contingency has not been considered. There certainly should be a provision for some recovery for a contractor who in good faith has furnished such emergency materials or labor. The same suggestion is also true of the other details required of the official ordering emergency work or materials, so that whatever remedy is given the contractor it should be inclusive and complete.

In discussing Section 86, I have purposely left for the final and most serious consideration a matter of grave import to this

Society, namely: How about the employment of experts such as architects, engineers and other professional specialists under this section?

"All expenditures of public money for supplies for PUBLIC CONSTRUCTION amounting to \$100 or more shall be made only by formal written contract," etc. Some will at once say this does not apply at all to such employment. Let us see about that. "Supplies" do not cover it. Does "public construction?" Strictly speaking and by dictionary definition probably the answer would be, "No," and the argument would be that most of such expert work is done and completed before the contracts for the "construction," which we are now specifying, are entered into. Of course, we do not object to the requirement of this section alone in this regard. Our objection is found in its combination with 86B, requiring advertisement, and 86C requiring an award to the LOWEST BIDDER. What kind of expert work would we get under such requirements? How could we employ the right man for the particular work with these restrictions? The courts have recognized the fact that competition by advertising and bidding with compulsory contracts with the lowest bidder is not proper in such cases where the employment depends entirely upon the personal knowledge, skill and judgment of a particular person. But this exception which exists to Section 419 of the New York City Charter has been made to no such strict wording as we now have before us. Appropriations for public contracts do not always specify every matter for which the expenditures can be made; and they usually provide merely for the "construction" of a certain building.

Yet there are many cases holding that where general power is given to construct a building it is entirely within the province of the person in charge of the work to employ professional skill not only to prepare plans, etc., but also for the supervision of the work. The further fact, that in many States, under the Mechanics' Lien Laws a supervising engineer or architect is always given a lien for his supervision, even though he cannot have such lien for drawing of plans, etc., supports this principle that such employment of professional men is part of the "construction" work. Then there are many statutes that specially

provide—as for example the Town Law and the Village Law—that as a part of the expense of “construction” must be considered payments to engineers, inspectors, experts, etc. Since there is sure to be a difference of opinion about this matter, it would seem fitting and safe to add this class of professional employment to the exception noted in our proposed amendment 86D, page 262, at lines 17-25, regarding monopoly purchases.

Attention is also specially directed to the fact that under a strict interpretation of this section, no work can be done by day labor involving the expenditure of public funds, nor can any purchases be made for cash without compliance with the stated requirements.

I had thought of suggesting a revised section for the one proposed, but I find that my revision would be so radical that I have decided to defer it at least until after the discussion of this paper. Assuming that the present form is desired I would suggest changing the word “agreement,” page 257, line 7, to “acceptance.” Page 258, line 10, for the sake of clarity I would suggest changing “the” to “such emergency.”

#### 86 B: ADVERTISEMENT, CONTRACT DOCUMENTS, ETC.

The provisions regarding advertisement where the estimated cost involves \$5,000 or over, are not much more exacting or costly than the present requirements in the late laws, Canal Improvements and Canal Terminals, although the limit there is \$10,000. The advertising for contracts involving less than \$5,000, excepting only the \$100 emergencies specified in the preceding section, is extremely radical. Just imagine in New York County advertising six times in each of three City dailies, and once in a weekly trade journal, for the wants of a Department, involving \$50 to \$500.

Under the existing laws advertising is not required for costs less than \$250 in the Second-Class Cities Law. Other limits are as follows:—Town Law \$300, Military Law \$500, Highway Law \$500, Insanity Law, State Charities Law and Charter of the City of New York \$1,000. Our classification of newspapers would

exclude the City Record in which the City Charter now requires advertising to be done. The present requirements as to the amount, kind and time of advertising, range from advertisement upon regulations of the Common Council in the Second-Class Cities Law, to requiring advertising once a week for four successive weeks in two newspapers published in the City of New York, one of which shall be published in the interests of engineering and contracting, and one each in the cities of Albany, Troy, Rochester, Buffalo, Syracuse, Utica and Plattsburg, and one in each county where the particular piece of work advertised is located, the latter being covered in the Canal Terminal Law, Section X.

The law just mentioned is interesting in this respect because of the following:—"In cases where the estimated cost of materials and work does not exceed \$10,000, the period of advertising may be abridged, and the work may be advertised by circular letters and posters, when in the judgment of the Superintendent of Public Works, approved by the Canal Board, such course may be desirable or necessary." This gives support to our later requirement that certain dealers or bidders shall be sent copies of the advertisement. As this question is largely one of practical rather than technical application, I shall not go into further detail regarding our present statutes.

The provision against subdividing work to evade the matter of advertising and award to the lowest bidder is helpful in view of the present state of the law on the subject. One of the earliest cases on this point, coming up under the New York City Charter, held that continuous work could not be divided into parts costing less than \$1,000, and thus escape the advertising, requirements, etc. Later there was another decision holding that each job, or hole of repairing to asphalt pavement, was a particular job which could be done, as far as each was under \$1,000, without public letting. Still later, the pendulum again swung, and this time with violence, holding that a contractor who had in good faith furnished the inmates of a public institution with supplies, upon orders each for less than \$1,000, but which aggregated over that amount, could recover nothing on account of the lack of public letting. The court of appeals has also made a distinction that where services are continuous in character, but terminable at

the pleasure of the employer, the monthly compensation being less than \$100, the contract for such services need not be at public letting. This was a case of garbage removal in the City of New York.

The present Charter of the City of New York contains a provision contrary to our proposed provision, wherein the Commissioner of Street Cleaning may hire such horses, carts, boats, steam-tugs, scows, vessels, machines, or tools for a day or trip, or for successive days or trips, without advertisement or contract founded on sealed bids, the compensation is by the day or trip, notwithstanding the aggregate compensation for such successive days or trips may exceed the sum of one thousand dollars.

Before leaving this topic I again want to ask whether our proposed amendment protects the contractor who shall have honestly furnished materials or supplies contrary to this provision, but unknown to him. Should not that be covered in Section 86 F?

Many of the present statutes support our requirement that the specifications and drawings be complete and ready for distribution before advertising is done. One of the opinions rendered last year by the State Attorney-General seems pertinent here. Considering Section 130 of the Highway Law he writes:— “It does not contemplate that the final adoption of the specifications shall be after the bids have been made and opened. The advertising for proposals is not to be made until after the final adoption of the specifications.” Then again he says:—“I think that no advertising for bids should be done until the village has decided what kind of pavement it wants, and the specifications are prepared and finally adopted, also that it is improper to ask for proposals and bids in the alternative on different classes of construction, one of which must always of necessity be more expensive than the other. It is not fair to bidders in contemplation of the law that the final adoption of plans and specifications should be delayed until after the bids are all in and opened, and then choose between different classes of construction.”

The definition or scope of actual advertisement required by our amendment is much less than is customary to-day. Nothing is said about certain matters which would seem rather essential,

namely, the corporate body or department, etc., calling for the bids, the terms and conditions under which bids would be received, and the time and place where the same would be opened. These suggestions are found in our present statutes entitled 'Canal Terminals,' "Highway Law" and "Town Law."

There are certain criticisms which I now wish to make of the form and certain wording. I do it in the spirit that we are all striving to avoid probable or possible conflicts, and endeavoring to make our statute comply with our own requirement for the contract documents, namely, that "they shall be clear and free from repetitions." Although drawings or plans are omitted from mention as part of the contract documents (page 259, lines 2 to 4), probably on account of the definition of "specifications," (same page, lines 10 to 12), yet the other parts of this section, except page 259, lines 30, 31, and other sections do not carry out this definition and arrangement. "Specifications and drawings" are mentioned on page 258, line 31, page 259, line 15; while page 263, line 18, mentions "plans and specifications." Again, the definition on page 259 is in conflict with the definition on page 261, lines 5 to 8, and with the spirit of many subdivisions under Section 86 D, which always speak of the "*wording*" or specifications. It is chiefly a practical question which definition should be used, but we can at least be consistent.

There seems to me to be a repetition between page 258, lines 30 to 32, and page 259, lines 15 and 16, which make the latter unnecessary. Would it not be well to define more fully what we mean by the use of the word "drawings?" Does that include detailed drawings, or simply the ordinary eighth-scale plans customary for use in calling for bids? The definition of the "contract documents" (page 259, lines 2-4), seems to me unnecessary and fraught with more danger in the way of conflicts and trouble than will be offset by the advantages. Would not the requirement that the said documents be filed in a certain office as the documents referring to a certain contract fulfill the purpose of the present wording? If it is considered advisable to retain the definition of specifications (page 259, lines 10 and 11), it would seem advisable to change the word "cover," line 10, to "include," and insert the word "cover" between "and" and "descriptions."

line 11. On the same page, line 19, would it not be safer to replace the words "producing them" by "printing the copy or copies desired."

Page 259, lines 26 to 29, regarding what the specifications shall contain seems improperly placed in this section, and if it means anything more than is called for under Section 86 D, it should be therein incorporated in such a way as to prevent conflict. In view of the present trouble which there is about annexing even specifications to the formal contract, the requirement of annexing should be omitted (lines 30, 31). As above suggested, the purpose of this will be fully carried out if there is a requirement that such documents be filed in a certain office immediately after the signing of the contract, and that said documents so filed shall not under any circumstances be removed nor changes thereon be permitted save pursuant to agreement in writing; also that they shall be subject to inspection, and of course subject to the call of any court, and that they should be retained on file until six years after the work is completed.

The final clause of Section 86 B is in its intention an absolute necessity, but have we sufficiently covered it, made the proper and necessary exceptions, and provided punishment for its neglect? The requirement that there shall be no advertisement without appropriation, is a change from the ordinary run of such statutes which usually specify merely an appropriation before entering into the contract. In view of my previous statement that it is now usual to appropriate for construction work and consider preliminary plans, surveys, bidding, drawings, specifications, expert services, all preliminary to advertisement, as a part of the expense of construction, it is proper to require that there be an appropriation as early as possible. Should there not be opportunity, however, to permit appropriation and contracts for partial construction work, for example, appropriation for foundations and contract therefor, without reference to the contract for the superstructure. This is covered somewhat by the Insanity Law, which contains the following:—"All contracts for the erection, alteration, repairs or improvements of hospitals, shall contain a clause that the contract shall only be deemed executory to the extent of

the moneys available, and no liability shall be incurred by the State beyond the moneys available for the purpose."

When are funds "legally available?" To show the importance of being more specific in this matter I will give you one of my personal experiences in this regard in one of the City contracts:—The City Charter provides that the Comptroller shall endorse his certificate upon every contract over \$1,000 that there remains unexpended and unapplied a balance of the appropriation or fund applicable to the contract. Without this certificate no contract is binding; but it is also stated that such endorsement shall be sufficient evidence of the appropriation or fund in any action. The Commissioner of Parks entered into a written signed contract for about \$1,500 with architects for drawings, specifications and supervision of a public comfort station. The contract was in the usual form approved by the Corporation Counsel, with the certificate of the Commissioner showing the funds applicable, namely, \$18,000 from a special fund for that purpose, and \$12,000 from the general funds for general park purposes. The Comptroller endorsed his certificate as to said funds. The work was started and when the time came, the City paid for the preliminary plans and specifications by two vouchers, chargeable against the two funds. Later the work was entirely abandoned, but not until the architects had completed their work ready for advertising and entitling them to another payment. They were refused further compensation for their work, and after action brought and a trial before a jury, the Trial Justice instructed the jury that the architects could not recover the pay they demanded because there was no appropriation for said work—the appropriation from the general park purpose fund rendering the contract illegal and invalid. As a recovery was had on another cause of action included in the same pleading, no appeal was taken from this decision. But it shows to what extent the Corporation Counsel and some judges will go to help the City, and how apparently plain statutory protections and justice are overcome.

Respecting expenditures of less than \$1,000, the City Charter has a requirement stating "the expenditure has been duly authorized and appropriated." In view of the many cases where contractors and others have been beaten out of their compensation,

notwithstanding this requirement, it is necessary to provide some fitting punishment for the violation of such provisions. Our proposed amendments punish the official by making him guilty of a misdemeanor; but what about the money thus lost to the contractor? It seems to me that either the contracting body or the official should be liable to some extent to the contractor.

The present Village Law contains this provision: "An officer or person who assumes to create a liability, or appropriate money or property of the village without authority of law, or assent thereto, is personally liable for such debts or to the village for such money or property." The only other solution of this difficulty is to require that the contractor be paid by the contracting body, much as is provided in 86F, first paragraph. If, as is suggested, our proposed amendments do not apply, or an exception is made, to professional employment contracts, yet this salutary provision should be made applicable to each and every contract or expenditure of public money whatsoever.

#### 86 C: BIDS AND BONDS.

In view of the specific and special requirements of the first paragraph of this section, it should be remembered that a slight failure on the part of some contractor to fully comply with them requires the rejection of the bid; and there will be occasions when this power will be used by some official to accomplish just what we are endeavoring to prevent. For example, there is a reported case where a bid was rejected because the proposal check was made payable to the State Treasurer instead of the Superintendent of Public Works, or because the prices were in figures instead of in words and figures.

The provision for an award to the lowest bidder with no power to reject all bids, nor power to readvertise under any circumstances, while chiefly a question of practical policy is an absolutely new departure from the present statutes. This important matter is found considered in our State Constitution, which declares that all contracts for work or materials on any canal shall be made with the person who shall offer to

do and provide the same at the lowest price, with adequate security for their performance, (Art. 1, Section 3). In judicially deciding what was intended, the Court has said that this provision must be applied in its spirit and not in its letter. Therefore, they said, that this power necessarily involved an exercise of discretion,—(1) Who is the lowest bidder? and (2) What is adequate security?

In our proposed statute we probably escape both of these discretions, since the method of determining the "lowest bidder" is fully set forth in 86 D, sections d and j, so that the only consideration is the bid which for a total sum gives the lowest total cost for the work.

In passing it is worth while to note that the familiar term which we are endeavoring to avoid, namely: "Lowest responsible bidder," is found in the Canal Law, sec. 124; Highway Law, sec. 48, 130; Highways, sec. 3; Insanity Law, sec. 56; Military Law, sec. 16; State Charities Law, sec. 48, and Town Law, sec. 487. The terms "lowest price with adequate security" is found, as stated above, in the State Constitution, and also in Canal Terminals, sec. 10; Second-Class City Law, sec. 120, and was in the laws governing New York City contracts between 1861 and 1881.

The Town Law, sec. 487, goes still further, and prescribes "the lowest responsible formal bidder." Our proposed term "lowest bidder" is to be found in the following statutes: Canal Law, sec. 141; Drainage Law, sec. 65; Highways, sec. 4; Military Law, sec. 183; Second-Class City Law, sec. 124; State Printing Law, sec. 6; Town Law, sec. 234, and Village Law, sec. 266, and New York City Charter (1901).

From the application of this term "lowest bidder" can we feel sure that we are now rid of all "discretion?" As long as there is the difference of opinion which now exists as to whether the duty of awarding a contract is ministerial or judicial, so long are we assured of differences of opinion as to the discretion permissible even under our phraseology. In one case the Court said such a statute as ours is not to be "construed literally and accepted as an absolute restriction. In such case undoubtedly the bid should be bona-fide and

should conform strictly to the prescribed specifications; but in determining whether a bid is lowest among several others the quality and the utility of the thing offered—in other words, its acceptability to the purpose for which it is required—must first be considered. The offer in nominal amount may be exceedingly low, while the thing offered may be exceedingly worthless." In view of our other requirements with regard to the specifications, I do not think this opinion could be applicable to our amendment. Right here I might suggest that the Baltimore Charter contained our words, "lowest bidder," and the Maryland courts have construed it to mean "lowest *responsible* bidder."

In another case involving this subject the lowest bid was rejected because the certificate of deposit did not contain the words "in cash." The Court was asked to mandamus the contracting board to give the contract to the lowest bidder, but they refused, holding that it was a matter of discretion, and the board having contracted with the next lowest bidder as the lowest, they would not disturb their act. Of course, if necessary, these various cases might be differentiated from our proposed amendment, but they all show a tendency to decide against our desire to exclude all discretion.

To my mind, the situation which we will create is covered by a case on the constitutional provision which went to the Court of Appeals. The contractor had fully complied with the requirements of the law and of the proposal, but while the engineer's estimate for earth excavation was 20 cents, the bid was \$3.50, and while the rock estimate was \$2.00 the bid was \$6.00. On the later work, however, this contractor's unit prices were so low that the total sum or cost of the completed structure was not much different from the engineer's total cost estimate. This bid was rejected by the contracting board since they held it was deceptive and fraudulent; and by the appearance of the bid it seemed evident that it was the intention of the bidder to perform that portion of the work which would be done first, and for which he bid excessive prices, and with the profits obtained he could pay the forfeiture on the bond, abandon the fifteen per cent. retained, and

yet have a profit of \$10,000, while the State would only have the work half done, and with trouble and great expense would have to get another contractor. The Board gave the contract to the next lowest bidder.

The court granted relief to the lowest bidder, holding that there was no condition against peculiarities, and that the compliance with the terms of the proposal by the lowest bidder was an acceptance of the contract by the contractor; that no discretion should be permitted. Upon appeal, both the Appellate Division and the Court of Appeals reversed this decision, the Court of Appeals saying, "The law has committed to the judgment of the contracting board the decision of the question as to what bids are most advantageous to the State, and the Legislature has given the full authority whenever in their opinion proposals are made excessive and disadvantageous to the State, to decline them. The only restriction on the power of the Board is that when they contract it shall be with the lowest bidder. This does not imply that the lowest bidder can invoke the power of the court to compel the Board to enter into a contract with him."

From this case, then, we deduce two important points—(1) That our amendment as proposed does not prevent unbalanced bidding, and (2) That even under our proposed amendment should a board give the contract to another than the lowest bidder he cannot get the contract by mandamus, but is left to his action at law for damages.

How can a board act under our law, assuming that the lowest bidder refuses to sign a formal contract and go on with the work? No court of equity will decree specific performance by a contractor, and once the lowest bid is accepted that ends the power of the Board. It cannot accept any other bid; it cannot even advertise again by specific wording. Should not that be remedied?

Again, suppose there are two lowest bidders. What can the Board do then? Your answer will probably be that such a case would never arise. It has arisen, however, and in this city under our charter. The 1901 charter required the heads of departments to reject all bids "or award the contract to

the lowest bidder unless the Board of Public Improvements by vote," etc., determined otherwise. In this quandary the city official passed over both lowest bidders and awarded the contract to a higher bidder. He was later indicted for his action. The opinion states our proposition, namely, "The only test of bids made under the Charter is, however, that of price." The court did not say what should have been done in such a case, hence it would be wise for us to provide for such a contingency.

Just one more word on what I consider the most fatal trouble with this section of our proposed amendment, namely, the inability of the contracting board to reject all bids. It has been held by the Attorney-General that when a law requires that the contract "shall be awarded to the lowest responsible bidder" that requires the exercise of discretion, and hence, as a part of that discretion, and without express authorization, it also includes the power to reject all bids. Since we intend practically, and we hope legally, to be rid of all discretion, we necessarily have also taken away the power to reject all bids. Some clause conferring that right is, therefore, most essential and necessary to be added to this section.

As a further aid to prevent trouble, how do we intend the contracting parties to act when there is only one bid? We have a case holding that in that instance such bid is not the lowest, and hence does not have to be accepted. But is that rule applicable where there is no power to reject all bids? This suggestion shows another needed addition to this section.

Another early case shows circumstances in this connection which should also be taken care of by our amendment. The engineer estimated earth 3,501, rock 12,388; the contractor guessed better than the engineer and bid \$1.85 for earth and nothing for rock, and got the contract. The completed measurement was earth 6,345 and rock 7,140; by which calculation this contract was highest by \$4,000, and \$5,000 more than the lowest bid. After the work was all done a taxpayer was granted an injunction restraining payment. The court held that since the charter required contracts to be let to the lowest bidder, and this contract being in direct viola-

tion of the law, it could not be enforced, and the contractor was refused any compensation whatever. Certainly the contractor should have gotten something for his work, even if he was not paid the contract price; and hence such a contingency should be protected. It is only fair to say there is a later case holding that the lowest bid should be determined by the engineer's estimate, even though such estimate be as a matter of fact false.

The Canal Improvement Law and the Canal Terminal Law both state that the quantities in the Engineer's estimate shall be used in determining the cost of the work, according to the different proposals.

Summing these suggestions then we must make changes:

1. To prevent unbalanced items of a bid.
2. To cover refusal of lowest bidder to proceed.
3. To allow rejection of all bids.
4. To provide for re-advertisement, re-letting, etc., under certain circumstances.
5. To provide for two lowest bidders.

Lastly. To provide where there is only one bidder.

Our proposed law does not seem to cover the question as to how many bids one person, corporation or company can submit. The Canal Law (art. X, sec. 142) provides that if any person submits more than one proposal all of them must be rejected. As this might be a means of accomplishing some of the evils we are trying to correct, it should be provided against.

The requirement of a five per cent. certified check, or bidder's bond, is found in our statutes Canal Improvements, sec. 7, Canal Terminals, sec. 10, and Town Law, art. XXIV, sec. 487. It may be interesting to note that the Town Law, art. XI, sec. 234, as amended in 1910, states that a 25 per cent. proposal bond may be required in sewer work. Certainly a 5 per cent. proposition is much better than permitting an official to fix the amount, as is the present method under the Insanity Law, State Charities Law and the Military Law. I would suggest that a sentence be added in this connection as to the method of forfeiture of these checks or bonds. This will be found in Canal Terminals,

sec. 10, and Town Law, art. XXIV, sec. 487. Something also should be said as to the return of certified checks or bonds of unsuccessful bidders.

A bond of 25 per cent. for security does not seem to be found in any of our present laws. They range, however, from 10 per cent., under the Canal Terminals (a late law), to 100 per cent. under the Highway Law, art. IV, sec. 48. Our latest law on the subject, in the amendment to the Lien Law, specifies a bond of a surety company, authorized to do business in the State of New York, of one-third of the contract price. This 1911 Lien Law requirement is so stated as to cover practically all expenditures of public money, either by the State or any municipality; so that our proposed amendment will seriously affect that law. In this connection one of the late laws makes a differentiation between contracts greater and less than \$1,000—the former requiring a bond and the latter none, provided payment was to be made after all the work was completed and accepted. Since we have no requirement for partial payments, it is suggested that this scheme be used: That is, contracts less than \$1,000 or upon which no partial payments are made, no bonds for security shall be required beyond the proposal check or bond. A requirement for partial payments should be made in view of the present wording and interpretation of public contracts, whereby they are considered entire contracts and all payments made are stated to be "advance payments," or payments made to assist the contractor in carrying on the work. Thus where a contractor breaks his contract there is an opportunity for the city to recover back the partial payments made.

Considering the text of this Section 86C, should not "or contracting board," be added after "official," line 3, page 260? Is there not a discrepancy between our requirement (lines 17 and 18, page 260), "An award *must* be made to the lowest bidders," and the requirement which is to be put in the specifications (page 261, lines 9 and 10), "provision that no bid aggregating more than 25 per cent. beyond this (engineer's estimates) will be accepted." This is especially noteworthy on account of our lack of granting power to reject all bids under any circumstances.

At page 260, line 21, since we mean the contract bond had it not better be so designated? Surely we intend to permit surety bonds; hence line 36 should have "or surety company" follow "bondsman."

#### 86 D: SPECIFICATIONS.

As I have already stated, our opening sentence of this section seems to be at variance with page 259, lines 26 to 29, and its contents as herein defined to be different from the definition, page 259, lines 10 to 14. As these are chiefly practical matters I shall leave them for your consideration as to what changes you shall make. In this connection the State of Pennsylvania has a statute under the title "Public Buildings and Grounds," P. L. 426 (July 2, 1895, sec. 1), as follows: Article 64—"Hereafter, on the letting of contracts for the erection and construction of any public building, when plans and specifications for same shall be submitted for bids the same shall be accompanied by a bill or list of quantities of materials required for such building, to be prepared and furnished by the architect or engineer preparing the plans, which bill or list shall be attached to the specifications, and shall be for a guide to bidders in making their estimates of materials required, and a means by which bidders may test their own estimates; provided, however, that the correctness of such bill or list of materials shall not be taken as being guaranteed by the authorities submitting such plans and specifications for bids."

The chief difficulty with this and any other statute of a similar nature is found in the fact that little or no attention is paid to it by the contracting boards or officials of the State. This I know to be a fact regarding this particular law in Pennsylvania. However, it is a step in the right direction and should be encouraged.

Our refusal to accept any bid more than 25 per cent. beyond the engineer's estimate is in line with a requirement of two of our best statutes—Canal Improvements and Canal Terminals—which provide, "No contract which exceeds by more than ten per cent. (10%) the gross cost of the work as estimated by the State Engineer, or by more than 20 per cent. the cost of any item therein, shall be awarded unless such award shall be approved by the State Engineer and Canal Board."

As is shown by my discussion of the lowest bid question we should cover this matter of cost of items so as to keep down unbalanced bidding.

The third sentence of (a) reads as follows: "The contract shall provide that if in the execution of the work it be found that any item will exceed the estimate in quantity *more* than twenty per cent. (20%) the work shall be completed by the contractor and the price of such work shall be fixed by arbitration, as provided for herein, and the contractor shall be entitled to receive actual, reasonable cost for such work plus fifteen per cent. (15%)." To my mind this opens the door for practically every evil that we are attempting to correct and prevent by our proposed amendment.

The use of the word "more" in line 13, page 261, in this sentence is the chief cause for this opinion. I am sure those proposing this sentence intended to specify that the contractor should do any items of work not exceeding twenty per cent. more than the estimated quantity of any such items found in the engineer's estimate which is a matter covered by our statutes, the Canal Improvements and the Canal Terminals. These statutes in such instances require the engineer's certificate that there is such excess of any item; 15 per cent. instead of 20 per cent. is the limit, and the Canal Board can compel the contractor to do the work at the contract unit prices and under its terms.

The use of "and," lines 14 and 16, creates a conflict as to how such work shall be paid for. As stated above, this sentence practically destroys the effect of all of the other restrictions set forth in our preceding sections, permitting the ordering of any amount of work of any item as long as it is more than 20 per cent. of the estimate at an arbitration price or cost plus 15 per cent.; and failing to specify what is to be done or paid providing the amount of work is between the estimated quantity and less than 20 per cent. I call this to your attention a second time on account of the seriousness of this sentence as it now reads. As food for thought, will our intended wording make a defaulting contractor liable for such work at such prices, when such additional work is found necessary in a breached or abandoned contract?

Our provision (c) that all contract documents shall be accepted by the bidder as correct would make a sweeping change in the present conditions under which public contracts are carried on. As is well known at the present time conditions underground are at the contractor's risk, even where the contracting body has made investigations. Suppose the contracting body in its effort to nullify this statement retains the present clauses requiring personal investigation of the site, etc., are we any better off than to-day? To my mind this raises a serious question as to how the courts will construe these clauses together. At least our requirement is a step in the right direction, so that the contractor shall have a chance to receive pay for work actually done.

(d) Our definition of lowest bid is much similar to a definition found in the Highway Law (sec. 130, par. 3): "The lowest bid shall be deemed to be that which specifically states the lowest gross sum for which the entire work will be performed, including all the items specified in the estimate therefor." Does our use of the word "determined" show that it involves discretion?

(f) Our statement regarding the securing of a certain result under such plans and specifications as are always found in public contracts is practically the law of this State. That is, that where you must follow plans, specifications and engineer's directions, naturally you cannot warrant a result. As a practical matter while this is the law, it is very difficult to get juries to act upon this law; hence, everything we can do to strengthen this principle of common law we should do.

In our consideration of the responsibility for repairs, we must not forget that especially in asphalt pavement work, except in the largest cities, the Asphalt Company is the only one in a position to cheaply and conveniently do repair work; and hence if their construction contract requires a certain amount of repairs their price is usually figured to cover such repairs or at least, on account of the monopoly, is high enough so that they should do such repair work. Should not such work be made an exception to our general provision?

(g) Are we able by this to escape the distinctions being made between "extra" and "additional" work? It would seem so, and this is a source of most sincere congratulation.

(h) Our provision here seems simply and plainly to show that we have gotten rid of all discretion in the determination of the lowest bid.

Why should not it be easier and cheaper in our arbitration scheme to have certain men named who should be available as sole arbiter, such as the President or other officer of The American Institute of Architects, or the President or other officer of any Chapter or branch, the President or other officer of The American Society of Civil Engineers, or of any local branch, or the President or other officer of our own Society or any branch, etc. In the time available I cannot go further into this question of arbitration, but it is as you know the matter of more present attention in engineering and construction circles than any other subject.

As I have already used so much time I have purposely restricted my remarks on 86D to a minimum and only taken up those strictly legal considerations as distinguished from the chiefly practical side of that section.

Page 251, line 37, I would suggest that "quantity" be interpolated between "each" and "multiplied." Page 263, line 25, add "or contracting body" after "official," because many public contracts are made by several officials as a board.

#### 86 E: EXECUTION OF THE WORK.

Apparently this section should make somewhat more mutually binding the decision and determination of the contracting board's engineer. There is a tendency to-day to make the engineer's decision binding and conclusive on the contractor and not on the other party, the public body which pays the engineer's salary. It is a question whether this provision will make any difference in our present law on the subject of engineer's certificates and engineer's determinations as to the completion of construction contracts. The intention to bind the contracting board more strictly by the acts of its agent is logical and proper.

How about the right of a comptroller to audit under this provision? As a matter of wording should we not add "or engineer" after "inspector," page 264, line 4; also "fraud or" preceding "conclusion," line 10?

## 86F: VIOLATIONS.

Throughout my paper I have shown circumstances under which we should protect the contractor beyond the extent set forth in our first paragraph. In fact, it is my personal feeling, after some considerable experience in at least New York City cases, that in all cases either of void, illegal or no contract, especially where the fault lies with the city or its departments or officials, the contractor should be paid at least the actual cost. My suggestion is that we have only covered the case "if the violation be one made by the contractor," and not those violations made by the other side. Should not the contractor recover as much where he is not at fault as where he is?

Since some contractors can make "actual cost" more than they should be paid, I would suggest that line 15, page 264, be amended by adding after "cost" the words "or reasonable value exclusive of all profits to him."

Now, gentlemen, I must close this rather long and probably uninteresting paper to all but those specially interested; but before doing so I must assure you that I have not been able to give this matter the time that it requires, and no one knows better than myself that I have only touched as it were the "high spots" in this proposed amendment. Although there are many things which I might suggest which should be incorporated in this law which are not touched upon in its present state, yet, feeling that the practical side has had such careful attention, I have been unwilling to suggest much new material. However, I am going to transgress this rule now to this extent: Should there not be a restriction against any contracting official or board compelling the contractor to sign a general release before permitting him to receive his hard-earned contract payment or retains?

This proposed amendment is a big proposition, and even after you have considered the points I have criticised, were the law passed it would doubtless require much attention and further amendment to keep it as a means for the betterment of public contracting conditions.

May I congratulate the Society upon the work already done in putting this amendment in its present form. We lawyers see the gloomy side of public contract work, and from our ranks

you will hear no dissent to this attempt to rescue contractors in New York City and State from the present unjust, unfair and treacherous conditions imposed upon them, and from the severely technical differentiations which are so commonly used to refuse them their compensation for honest construction work done or materials furnished.

(Applause.)

NOTE.—The suggestions made by the author of the foregoing paper were considered by the Committee on Legislation, and the proposed Act was revised by them in accordance therewith. This, together with the discussion of this paper, will be printed in the next issue of *The Journal*.

*Reprinted from May, 1912 issue of the Journal. (See Footnote Page 125.)*

# AMERICAN SOCIETY OF ENGINEERING CONTRACTORS

11 BROADWAY, NEW YORK, U. S. A.

## STATE OF NEW YORK AN ACT

[EDITOR'S NOTE:—The Act printed below, embodying the principles outlined in Maj. C. E. Gillette's paper "Competition in Public Contracts," published in the February, 1912, issue of the Journal, and of the various discussions thereof, has been drafted by the General Committee on Contracts and Specifications, with a view to having same appended to the Municipal Law of the various States of the Union. In its present form this Act pertains directly to the State of New York, but this is not intended as a limitation as it is proposed to bring it before the Legislatures of all the States. It is hoped that the members of the Society will at once forward to the Secretary, in writing, their views in regard to this Act.]

To amend the General Municipal Law, in relation to the form of contracts for the purchase of supplies and of contracts for construction work, the advertisements of invitations to bid, the forms of bids, their reception and disposition, the forms of specifications for such contracts and their performance for municipalities, boards, commissions, and other bodies or officials charged with the expenditure of public money.

The People of the State of New York represented in Senate and Assembly, do enact as follows:

Section 1. Article five, chapter twenty-four, of the laws of nineteen hundred and seven, entitled "General Municipal Law of the State of New York, constituting chapter twenty-four of the Consolidated laws," is hereby amended by adding thereto six sections, to be sections, 86-A, 86-B, 86-C, 86-D, 86-E and 86-F, respectively, to read as follows:

### 1    86 A: THE PURCHASE OF SUPPLIES AND MAKING OF CONTRACTS.

3    All expenditures of public money for supplies or for  
4    public construction amounting to \$100 or more shall be made  
5    only by formal written contract signed by the respective par-  
6    ties thereto. All expenditures amounting to less than \$100  
7    may be made by an informal written proposal and agreement

1 but, whatever the form, the contract shall be in writing.  
2 Purchases and contracts involving less than \$100 may in  
3 emergencies be made by telephone or telegraph without  
4 advertising, provided at least three bids be obtained, and that  
5 the bidders and prices be scheduled and posted for one week  
6 in a suitable place open to public inspection with a statement  
7 of the nature of the emergency, and the facts showing  
8 whether or not it could have been avoided by ordinary fore-  
9 sight. Any public official who makes an untruthful state-  
10 ment in this connection shall be guilty of a misdemeanor.  
11 All the bids and the acceptance shall be confirmed in writing.

12 86 B: ADVERTISEMENT, CONTRACT DOCUMENTS, ETC.

13 All public contracts for construction or for the purchase  
14 of goods involving an estimated cost of \$5,000 or more shall  
15 be advertised in the three local papers of the county in which  
16 the work is located having the largest sworn circulation, and  
17 at least one weekly trade journal of suitable character.  
18 These advertisements shall begin to run four weeks in ad-  
19 vance of the day set for the opening of bids. In dailies it  
20 shall appear for six consecutive numbers of the publication.  
21 It shall appear again once or twice just before the date of  
22 opening. In weeklies it shall appear in every issue previous  
23 to the date of opening. Contracts for less than \$5,000 shall  
24 be advertised in the papers above mentioned and shall begin  
25 to run at least two weeks in advance of the day of the open-  
26 ing of bids, except as noted in par. 86-A of this act. If the  
27 total cost of the work for which an appropriation has been  
28 made is in excess of \$100 it shall not be subdivided so as to  
29 evade the provisions of this section. No advertisement shall  
30 begin to run until the specifications and drawings are com-  
31 plete and ready for distribution. All officials, boards, com-  
32 missions, or departments of a municipality who are charged  
33 with the duty of purchasing supplies or making contracts  
34 shall keep in their respective offices various classified lists of  
35 all known dealers or contractors likely to bid or who request  
36 that their names shall be placed thereon; these dealers or  
37

1 bidders shall be sent copies of the advertisements by mail as  
2 soon as they begin to run. The following shall constitute  
3 the contract documents for every contract, viz., the adver-  
4 tisement, instructions to bidders, the specifications and the  
5 contract proper. The advertisement shall consist simply of  
6 a notice of the kind of work or materials wanted, the funds  
7 available for it, and the place where information can be ob-  
8 tained. The instructions to bidders shall cover all informa-  
9 tion necessary to the intelligent preparation of a bid that is  
10 not covered in the specifications or contract. The specifica-  
11 tions shall cover the complete drawings and descriptions of  
12 what is required for the particular work. The contract must  
13 be a legal document, containing no specifications whatsoever;  
14 its form must be published with the specifications.

15 The specifications and drawings shall be ready for dis-  
16 tribution as soon as the advertisement appears. Anyone may  
17 secure a copy of the specifications and drawings upon pay-  
18 ment of a price which shall not exceed the actual cost of  
19 producing them. There shall be no other requirement neces-  
20 sary to obtain them and the cost price shall be refunded  
21 upon their return after the opening of bids.

22 The advertisement, instructions to bidders, specifica-  
23 tions, and contract shall be clear and free from repetitions.  
24 and shall cover all information necessary for the prepara-  
25 tion of a bid. Words shall be used in their meaning as  
26 specified in Webster's Dictionary. The specifications shall  
27 contain a list of all materials to be used or handled to within  
28 10 per cent. of the amount required to complete successfully  
29 and economically the construction proposed.

30 The advertisement, instructions to bidders and specifica-  
31 tions, shall all be annexed to the contract proper. No con-  
32 tract shall be advertised until funds approximating in  
33 amount the cost of the proposed purchase or construction  
34 have been made legally available for the purpose.

35 86 C: BIDS AND BONDS.

36 Instructions to bidders shall specify that each bid shall  
37 be enclosed in a plain opaque envelope sealed with wax, and

1 stating the work bid upon and the date of opening. This  
2 envelope shall be enclosed in a larger opaque envelope ad-  
3 dressed upon the outside, to the official, but without any in-  
4 dication that it contains a bid.

5 Bids shall be opened in public at the time and place  
6 stated in the advertisement. All bids received which are  
7 executed in all essentials in the form prescribed by the pro-  
8 visions of this act shall be retained and opened at the stated  
9 time and place. If, upon opening, any bid shall be found  
10 which contains erasures or changes in prices, either in figures  
11 or in wording, such bid shall be rejected and not considered.  
12 After the opening of bids, the public shall have the right to  
13 inspect the same for a reasonable length of time in the pres-  
14 ence of the official inviting same or in the presence of a  
15 properly appointed assistant. No change of words, figures,  
16 or marks of any kind shall be made upon a bid by any person  
17 after it is opened. In all contracts an award must be made  
18 to the lowest bidders at the time and place of the opening of  
19 the bids, or as soon as the bids are computed, provided, that  
20 the award may be delayed temporarily on account of insuffi-  
21 ciency of the bond. Provisions shall be inserted in the con-  
22 tract placing all responsibility upon the bondsman or bond-  
23 ing company and making suitable provisions for the taking  
24 over of the contract by the bondsman in case of delays, etc.,  
25 on the part of the contractor and providing suitable penali-  
26 ties for failures on the part of the bondsman to do this with  
27 feasible provisions for the prompt enforcement of such pen-  
28 alties. If the responsibility of the bondsman or bonding  
29 company is unsatisfactory to the official he may require sub-  
30 stitutes subject to appeal to the courts. Irresponsible bid-  
31 ders shall be guarded against by the requirement of the bid  
32 being accompanied by a certified check or bidders' bond in-  
33 suring the signing of the contract. Such check or bond shall  
34 not exceed five (5) per cent. of the estimated cost of the  
35 contract. The bond to accompany the contract itself must  
36 be executed by a responsible bondsman and shall not exceed  
37 twenty-five (25) per cent. of the total estimated cost of the  
38 contract. No contract shall call for the retention at any time

1 of more than ten (10) per cent. of the payments made or of  
2 the estimated cost of completing the work from that time  
3 when the latter would call for less.

## 86 D: SPECIFICATIONS.

5 (a) The specifications for construction work shall con-  
6 tain an official estimate of the amounts of the different  
7 classes of work to be done together with lists of material to  
8 be furnished. They shall also contain an official estimate of  
9 the total actual cost of the work and a provision that no bid  
10 aggregating more than twenty-five (25) per cent. beyond  
11 this will be accepted. The contract shall provide that if in  
12 the execution of the work it be found that any item will ex-  
13 ceed the estimate in quantity more than twenty (20) per  
14 cent., the work shall be completed by the contractor and the  
15 price of such work shall be fixed by arbitration as provided  
16 for herein, and the contractor shall be entitled to receive act-  
17 ual reasonable cost for such work plus fifteen (15) per cent.

18 (b) All excavation shall be unclassified and specifications  
19 for excavation, except dredging, shall require unit  
20 prices bid for each 5-foot section of depth measured from  
21 the surface with a provision adding a bid amount extra for  
22 loosening all rock. All material shall be classified as rock  
23 which the contractor loosens by actual drilling and blasting.

24 They shall also provide that excavation shall be only  
25 within certain specified lines and the contractor shall be re-  
26 quired to keep flowing material, such as mud or quicksand,  
27 from flowing into the space specified for excavation, or to  
28 remove such inflowing material free of charge.

29 (c) All contract documents shall be accepted by the  
30 bidder as correct and if conditions prove essentially different  
31 from those represented, the greater or less cost to be  
32 paid shall be fixed by arbitration as provided for herein.

33 (d) The specifications shall call for an itemized list of  
34 prices in the bid, the units of the different kinds of material  
35 or classes of work used in the structure, appearing in the  
36 schedule. In construction work the lowest bid shall be deter-  
37 mined by the sum of all the items each multiplied by the  
38 price bid.

1        Contracts for construction work shall not include the  
2        furnishing of any supplies beyond those actually used in the  
3        construction work, except essential appurtenances of ma-  
4        chinery.

5        In purchasing supplies for future use complete sched-  
6        ules of such materials wanted yearly shall be published with  
7        the estimated amounts of each that it is expected to use, to-  
8        gether with full specifications for every item, such specifica-  
9        tions not to violate any of the provisions of this act. In  
10       such cases provisions must be made for receiving bids on  
11       any one or more items. Awards must be made to the lowest  
12       bidder for each item, provided that if any bidder is lowest  
13       only on items aggregating less than \$100, in the estimate  
14       and less than \$100 in the amount of that item actually used  
15       during the preceding year then such items may be awarded  
16       each to the next lowest bidder for such item.

17       The purchase of articles, so covered by a monopoly  
18       that competition is impossible, may be made, irrespective of  
19       the provisions of this law, provided the person or parties  
20       furnishing the said articles shall file with the purchasing  
21       official an affidavit stating that the price is as low as that to  
22       the most favored customer for similar quantities and qual-  
23       ities, under similar conditions.

24       (e) The specifications shall be so worded and all ar-  
25       rangements and management concerning the bidding shall  
26       be such that all bidders shall be bidding upon fair terms for  
27       exactly the same structure or the same result, and upon  
28       terms of exact equality as to advantage or disadvantages in  
29       so far as the official calling for bids or other official or of-  
30       ficials can control or embody it in the bid.

31       (f) No contract shall require the contractor to con-  
32       struct the work according to the specifications and at the  
33       same time be responsible for accomplishing certain results,  
34       or to warrant the endurance of the work, or to be responsi-  
35       ble for the repairs for any specified length of time after  
36       the completion of the work.

37       (g) Where contingencies exist or changed conditions  
38       are liable to arise provision shall be made for paying the

1 contractor upon terms specified. The contractor must not  
2 be required to cover such contingencies without specified  
3 remuneration.

4 (h) The terms "discretion of the engineer," "judg-  
5 ment of the engineer" or their equivalent shall not appear in  
6 any public specification or contract, calling for their exer-  
7 cise after the opening of bids, unless they be accompanied  
8 by full explanation in the specifications showing exactly  
9 how they will be exercised in the event of any of the con-  
10 tingencies happening to which they refer.

11 (i) There shall be no requirements in the specifications  
12 or in the management of the bidding that shall require any  
13 citizen or company to disclose the fact that he or it con-  
14 tempts bidding or have any interest in a coming bidding.

15 (j) Specifications for construction work shall be so ar-  
16 ranged and worded that in comparing bids only one thing  
17 need be taken into consideration—the total cost of the work.

18 (k) A full copy of all plans and specifications shall be  
19 easily available to the public in the immediate vicinity of the  
20 work at all hours when work is being prosecuted in that  
21 locality.

22 (m) If differences arise in the execution of a contract  
23 as to the meaning of the terms of the contract, the matter  
24 shall be adjusted by arbitration. The contractor shall select  
25 an arbiter, the official another and these two shall select a  
26 third.

27 In case either party refuses to appoint an arbiter within  
28 three days after the receipt from the other party of a writ-  
29 ten demand for arbitration of any stated matter, or if the  
30 arbiters selected do not within ten days choose the third  
31 arbiter, the contractor shall carry on the work as directed  
32 by the proper official subject to future adjustment by the  
33 proper court without the loss of any right to either party  
34 from such direction or its acceptance.

35           86 E: EXECUTION OF CONTRACT WORK.

36           In the execution of contracts of sale or contracts for  
37 construction the necessary number of competent inspectors

1 shall be appointed by the proper official or officials to see  
2 that the specifications and drawings are literally adhered to.  
3 The completion of the work or the delivery of the goods  
4 shall be followed by the certificate of the inspector in charge  
5 as a *prima facie* evidence of compliance, and it shall certify  
6 that the work has been properly and completely performed  
7 or the materials furnished in accordance with the contract.  
8 This certificate approved by the contracting official shall  
9 relieve the contractor of all further responsibility, except in  
10 cases of collusion.

11 86 F: VIOLATIONS.

12 Violations of the provisions of this Act shall, if the  
13 violation be one made by the contractor, render the contract  
14 null and void, but he may recover in an action at law for  
15 the actual cost of labor and materials furnished.

16 Any official violating any of the provisions of this Act  
17 shall be guilty of misdemeanor. The failure to award the  
18 contract to the lowest bidder, whose bid is in compliance  
19 with the provisions of this act, shall entitle him to recover as  
20 damages full profits for the entire contract.

21 Any citizen of the state and any corporation authorized  
22 to do business in the State shall have the right of injunction  
23 in the proper court to require prompt compliance with this  
24 law, and such citizen or corporation shall have the further  
25 right to appear as a party in interest in any suit between the  
26 contractor and the official whenever the matter of any public  
27 contract comes before the court, together with the further  
28 right to appeal to the proper court, from any decision made  
29 by arbitrators appointed under the provision of this act.

30 All laws in conflict with the above are hereby repealed  
31 in so far as such conflict may exist.

32 2. If in the execution of this law, the work of the offi-  
33 cial or the contractor is unduly hampered by the public or  
34 otherwise, special rulings and regulations may be made by  
35 the court upon proper presentation of the matter.

36 This act shall take effect immediately.

# AMERICAN SOCIETY OF ENGINEERING CONTRACTORS

11 BROADWAY, NEW YORK, U. S. A.

PAPER No. 49.

## LEGAL QUESTIONS INVOLVED IN THE PROPOSED AMENDMENT TO THE GENERAL MUNICIPAL LAW OF NEW YORK†

BY

WILLIAM L. BOWMAN<sup>‡</sup>

(Member of the Society.)

### DISCUSSION.

MR. WEGMANN: Mr. Bowman referred to the contract for constructing the New Croton Aqueduct tunnel under the Harlem River. This work was awarded to O'Brien & Clark in 1886. The contract was soon thereafter assigned to Charles Peterson. It formed part of the Division of the New Croton Aqueduct, of which I had charge. Some points about the litigation arising out of this contract, which have not yet been finally settled, may be of interest.

The engineers of the Aqueduct Commission of the City of New York, under whose direction the new aqueduct from the Croton Valley was built, had made numerous borings to establish the level of good, compact rock under the river. In the contract drawings, they showed the proposed tunnel located 150 feet below the surface of the river with at least 30 feet of solid rock above the tunnel.

The specifications for the work contained, however, the following clause:

“As the result of the borings leave some doubt in regard to the compactness and quality of some of the rock under Harlem River, a preliminary tunnel, or test drift, is to be driven from

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<sup>†</sup>The proposed amendment was published in the May, 1912 issue of *The Journal*

Shaft 25 to such a point as the Engineer shall designate; if the character of the rock is satisfactory to him the test drift is to be enlarged to the proper size for the construction of the Aqueduct. If, on the contrary, the rock is found unsatisfactory, the test drift is to be abandoned, Shaft 25 is to be deepened, and the tunnel is to be started at such lower elevation, that the Engineer may designate."

The test drift was started from Shaft No. 25, located on Manhattan Island, as required. When it had been driven for about 300 feet from the shaft it was found that, instead of having at the end of the heading 30 feet of solid rock overhead, the test drift had entered a pocket of decomposed rock, which was formed by borings taken in the drift to extend to a depth of 75 feet below the proposed location of the aqueduct tunnel. This pocket of soft rock continued for about 30 feet in front of the test drift and the borings showed beyond the pocket, lime-stone, full of open seams.

The contractor refused to continue excavating the test drift, claiming that it would involve great danger of loss of life. After a great deal of discussion, the Aqueduct Commissioners ordered Shaft 25 to be sunk 150 feet deeper and the aqueduct tunnel to be excavated 300 feet under the Harlem River.

The Contractor proceeded to carry out this order and completed the work without meeting with any further difficulties early in 1890. He then brought suit to recover damages amounting to about \$300,000 for changes made in the plans, and for the additional expense involved in constructing the aqueduct tunnel 300 feet, instead of 150 feet below the Harlem River.

This law suit, known as the Peterson case, has been in the Courts for more than 20 years. The lawyers for the Contractor waited about 16 years before they brought the case to trial, hoping probably, that the City's witnesses would either die or get scattered. At the first trial, the City won in the lower Courts, on the ground that the case was outlawed by the Statute of Limitations. The Court of Appeals by a majority of one, reversed these decisions and sent the case back for trial. At the second trial, the City won in the lower Courts on the Law

Points, but the Court of Appeals again sent the case back and it must be now decided on the merits of the case.

The most important point involved in this suit is the question whether the Engineer had the right, under the clause quoted above, to order the contractor to construct the aqueduct tunnel 300 feet below the Harlem River instead of at a depth of 150 feet as shown in the Contract Drawings. The Court of Appeals has decided this question in favor of the City. While this may be in accordance with law, it will seem to many to be unjust from the Contractor's point of view.

Mr. William B. King gave us recently a paper in which he pointed out some objectionable provisions contained in Government contracts. Among them he mentioned the refusal of the party giving out the contract to guarantee the correctness of its preliminary borings. I am strongly of the opinion that such contracts should be drawn up in such a manner that the contract can be terminated or amended by a supplemental agreement, in case the indications of the borings prove to be grossly wrong. Let us hope that as our Society of Engineering Contractors grows in numbers, we may exert a strong influence to have contracts for public works worded in such a manner that they will be equally fair to the party awarding the contract and to the contractor.

MR. BAMPFORD: In general, I am strongly in favor of practically all of Mr. Bowman's objections to the proposed law. If he would re-draft the proposed laws embodying the points he has criticised, that would give the Committee and the Society a better chance to see just wherein the differences lie between Mr. Bowman's suggestions and those of the Committee.

To take up a few specific points which Mr. Bowman raised:

(1) The filing of documents. My attention was called this year to the report of the United States Commission on Economy and Efficiency. House Doc. 670, page 423, in which they have taken up in detail the exact system of filing government documents, the law affecting the filing of government documents, and including the recommendations of various commissions and organizations for a number of years back. Just what will happen to the present

and final suggestions of the Commission on Economy and Efficiency I do not know.

(2) On the question of profit it seems to me we have not yet determined legally just what should be classed as profit. I know in many cases there is a wide diversity of opinion, whether the contractor's profit includes his general office expenses, carrying charges, superintendent, tools, etc., or whether it should cover only the amount of money which the contractor receives as his personal remuneration for his personal services and knowledge over and above the general expenses, etc.

I find that the British authorities distinguish between profit and "establishment charges," which is here usually a part of the profit. Thus what we include under our ten per cent. profit they class as twenty-five to fifty per cent. profit.

(3) The question of arbitration is one in which I am very much interested and to which I have given considerable study. I think the provision in the proposed law, and I thought so at the time, is not in line with the most advanced thought, which concedes that a single arbitrator is much to be preferred over a board of three.

Furthermore, I feel that our clause is very limited and defective. In the proposed law there should be permission to arbitrate in accordance with the "Arbitration Act," which would mean that we should prepare and submit another and separate act relating solely to arbitration. I have in mind the British "Arbitration Act 1889" as a model.

We have arbitration under the code in New York City, which a number of people, including the Chamber of Commerce of New York, seem to think covers the ground; but to my mind the British Act is superior. I have been told New Jersey has no provision for arbitration of any kind, and the majority of the other States of the Union are in the same condition. Therefore, if we could draft a separate act regarding arbitration, following the British Act, we need only mention that the arbitration should be in accordance with the Arbitration Act.

I hope that this Society when it starts preparing an arbitration act will co-operate with the New York Chamber of Commerce, Board of Trade and Transportation and other bodies. I

have had some correspondence with a number of the New York bodies, and I think we could get them to assist us in putting through such a law in the State of New York.

The fourth and last point relates to the provisions of Section 36-E, "Execution of Contract Work." That whole provision struck me at the time as being one of the most vicious in the entire act as submitted. My way of looking at it did not meet with the support of the other members of the Committee.

MR. SNYDER: In the matter of actual reasonable cost, Page 261, lines 16 and 17.\* I think that should be a little better defined. On a certain job in Cuba we had to make a lengthy investigation to determine what plant would be the best to handle this particular work. The Chief Engineer said we could start on two sections of it. We asked if he had any objections to our having sub-contractors start a certain piece of the work, and he said "No." He also said he would pay for the reasonable cost plus a percentage. We advertised for bids, and had bids from \$1.50 to \$15.50 a cubic meter. We notified the Chief Engineer, and he said they were acceptable. We started our work, and at the end of a month asked for our estimate. He replied, "What do you want an estimate for?" I said, "To pay our contractors and so that I can notify our New York office how we are progressing with the work." He said, "We can give it to you, but you do not need it. We will pay you what it has cost the sub-contractor plus fifteen per cent." I then inquired, "Is that your idea of 'reasonable cost to the contractor'?" He said, "Yes, sir; it is. That is my ruling."

We took the matter up with the War and State Departments and they sent a commission of engineers to Cuba and finally the award was made by a commission consisting of the Secretary of Public Works, the Secretary of the Public Treasury, and other officials. We went before the board and had a number of these objectionable clauses stricken out. Their ruling was that labor and material, as expended day by day, was to be checked each day, and our sub-contractor and the inspector to sign the report likewise each day. To that was added three per cent. for the use of

\* The JOURNAL, May, 1912.

tools. We added seven per cent. for administration and services of men in our office who were not engaged on that particular work solely. And on those totals we received fifteen per cent. profit, and even with those different percentages allowed, extra work did not pay us. We were required to do twenty per cent. of extra work and every bit of it was done at a loss.

Therefore this clause should read "Labor and materials, plus plant and overhead charges plus fifteen per cent.," otherwise you lose.

MAJOR GILLETTE (*President*): Did your contract provide for arbitration?

MR. SNYDER: No, sir; it did not. Even then so many of these things that I mention were too small to submit to arbitration. I am very glad that there is a provision that plans must be placed and kept on file. Instead of getting one plan, we were told there were 2,500 to 3,000 plans. We could not see all the plans. To our demands the Chief Engineer would reply, "Do you doubt my word?" He would not let us see them. We finally had to get an order from the Provisional Governor, and when we finally saw them we found that one-half of them were plans we did not bid on, but it took a year and a half to learn this.

MR. KING: I do not want to say a word in criticism of this proposed act without expressing my astonishment at the great amount of work and thought which has been given to this by Major Gillette and the committee.

Let me say two or three things. I agree with the last speaker on the subject of the definition of what is reasonable cost. I recently had a case in the Court of Claims where the extra work was 29 per cent. of the total original work, and which had been certified by the engineer. When a controversy arose and the case was litigated the courts allowed subsequently the actual reasonable cost, not only of days' work and labor entering into the work, but also of the 29 per cent. extra work.

One particular provision that occurs to me is at the conclusion of Section 86, page 264,\* as to the effect of the certificate

\* The JOURNAL, May, 1912.

of the inspector, which is considered as *prima facie* evidence of compliance, when it certifies that the work has been properly and completely performed or the materials furnished in accordance with the terms of the contract. "This certificate approved by the contracting official shall relieve the contractor of all further responsibility, excepting in cases of collusion."

We should understand exactly what this certificate should include, and then endeavor to express that with greater definiteness than it is here expressed. I think we can reach language a little more explicit, which will stand the test of legal action.

One of the provisions of the act, appearing on page 264, \*Section 86 F, is as follows: "Violations of the provisions of this act shall, if the violation be one made by the contractor, render the contract null and void; but he may recover in an action at law for the actual cost of labor and materials furnished."

Again, the act gives specific details as to how certain of its provisions shall be carried out. For instance: "The bid shall be enclosed in a plain opaque envelope sealed with wax and stating the work bid upon and the date of opening. This envelope shall be enclosed in a larger envelope addressed upon the outside by the official, but without any indication that it contains a bid."

Now one bidder might seal with glue instead of with wax. That would be strictly speaking a violation, not an important one, still his bid could be refused.

In the next place, while it provides what shall be done for a violation by the contractor, there is nothing said regarding violation by the official, except that the official is guilty of a misdemeanor. I think that should not be left to inference or construction, but that it should be explicit.

So there are a number of things which might be omitted, and some added—extremely valuable and good as the proposed act is.

I should like to see a provision added to the effect that a receipt in full should not be demanded from the contractor at the close of the work—or at least that no release of all claims should be demanded. If you do not give up all you claim to be due, the official may not pay what he admits to be due. That is not just.

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\* The JOURNAL, May, 1912.

I think, therefore, the principal thing for us to do is to consider this again in the light of the suggestions by the committee, and then have it drafted into final form for consideration by the legislature.

MAJOR GILLETTE (*President*) : Different minds naturally attack a problem of this kind from different points of view, but there is no doubt that there is one essential in which the Act is lacking, it is the proper legal verbiage to accomplish what we as engineers undertook to secure. There are legal points of which we know nothing; and, therefore, I think the suggestions of Mr. Bowman and of Mr. King are quite valuable.

However, while this law is drawn in the form of an Amendment to the New York law, yet we are not simply a New York State organization, and we drafted this model for general use and to get it into something like legal phraseology. The New York law was taken only as convenience basis. The New York Legislature may consider this Act, and with their knowledge of their own laws, could frame an acceptable amendment or new law. It is quite possible that it may come up before the Pennsylvania Legislature before it is presented to the New York Legislature.

Another point Mr. Bowman discussed has been gone over very thoroughly before. He seems to criticise the smallness of our one hundred dollars limit, but there have been so many cases where enormous sums have been spent on a \$500 limit that it is advisable to cut it lower. You all remember the experience Buffalo had with Colonel Ward, the Commissioner of Public Works, working under a \$500 limit. He bought 83,000 pounds of lead in \$498 lots at exorbitant prices, etc. So what seems to be a small item is really an important matter.

Another point that seems very small just now which was criticised by Mr. King relates to the sealing up of the bids. I have known of sealed bids being steamed open in an office and the lowest bidder before the bids were opened was not the lowest bidder when they were officially opened. However, in view of the legal point raised, it might be a little too strict.

Now, as regards Mr. Bowman's remarks relating to emergencies. It does look hard to require thirty days advertising, as

was required by the Comptroller's clerk who refused to pass a voucher for a tug to put out a fire on a dock because he had not advertised for thirty days. But most emergencies can be covered by hired labor. When your canal breaks, give the superintendent at that point power to hire laborers to go to work, and he will not have to buy many supplies at over a hundred dollars a lot. There will be very few cases that will not be covered by that.

As to hiring experts that is outside of this law. It relates to supplies and construction work, and experts are not a part of construction. They only represent the official of the purchasing municipality. There should, however, be a law even to cover expert services, for it happened that one eminent teacher in this neighborhood has drawn about \$500,000 for expert services to the City of New York, without any competition, and it is probably quite doubtful whether New York got one-half million dollars of value. But that is another story, as Kipling says.

We are now discussing the purchase and supply of construction work, and if we get that well covered, we will then take up these other subjects, which are not liable to such gorgeous abuse as the affairs we are now dealing with.

We require that an itemized estimate shall be made and the total bid must not exceed that by twenty-five per cent. Then we say that, if any item exceeds that more than twenty per cent, it should be done under this arbitration clause of "cost plus fifteen per cent." That prevents the unbalanced bid. We do not care how much work the contractor does on an item which pays nothing or a small price, but we do not want him to do a lot of work on an item where he bids high. So there can be no gross robbery on the old unbalanced bid average where the official will call for only a little of what he has specified much of, and high on something he has specified a small quantity of.

Mr. Bowman's criticism is taken from the point of view of the engineer and contractor fighting each other. That is not really the case we are trying to cover. We are not wholly trying to protect the contractor against the engineer; we are trying to protect the public against the combination. That is where the trouble lies. And incidentally, to further that object, we are try-

ing to protect the honest bidder against the fellow who would be likely to act in collusion with the engineer.

The power to reject all bids is one we want to avoid absolutely. In Philadelphia that was the method by which the city lost \$6,000,000. They would get bids, and then throw them all out and keep doing that until McNichol got the contract. The city should first have its money ready and a competent engineer to prepare specifications; and when the latter are fully and completely ready, advertise widely to get bids on what is wanted. Then it has undertaken a legal responsibility to the people who go to the expense and time and trouble to make bids, and it must award the contract to the lowest bidder or pay his loss.

The question of the lowest bidder refusing to sign a contract is remedied by requiring that he furnish a bond to guarantee that he will enter into such a contract. Then if he does not, he forfeits the difference between his bid and the next higher.

MR. BAMFORD: Why not have it provided that the city will award the contract or penalize itself for the same amount which the contractor must pay if he does not execute the contract after it has been awarded to him.

MAJOR GILLETTE (*President*): In some cases it might be reasonable to have the city penalize itself if it does not award the contract. But the point is that when the city prepares to make a contract it should make one, otherwise it opens the door to unlimited fraud. A common method in Philadelphia was to advertise, and then if the right man got the contract they would make the appropriation, and if the right man did not get the contract they would not award it because there was no appropriation.

The city should specify what it thinks it wants to do, and then specify, for instance, that for each extra foot the contractor has to go down he shall receive a definite price. Then leave the decision to the engineer as to whether he shall go down, and if so, just how far.

I do not believe in any law that gives the awarding officer any discretion whatever as to the lowest bidder. The moment you say "reasonable" or "responsible" the political grafters will

jimmy the door open. They must make an award or pay a penalty, and the award must be to the lowest bidder.

When this paper is printed, I think with what we have we might go before the legislatures and if they have good intentions they will draft a law to answer the purpose.

MR. RIPLEY: On page 260, line 21,\* in regard to bond, Mr. Bowman was going to insert the word "contract" before the word "bond." What do you mean by that; faithful performance bond?

MR. BOWMAN: Yes.

MR. RIPLEY: Why should not that cover the labor bond as well? Why not say "bonds," and the plural in the next sentence "bondsmen." It seems to me you should cover both in that clause.

MAJOR GILLETTE (*President*): The government calls for two bonds, one to guarantee that the lowest bidder will make a contract, and the other a much larger one for the faithful performance of the contract. I have the word "bond" here. This is for general use, as in many States they do not have a labor bond.

MR. RIPLEY: In regard to Section 86-E\* I am frank to admit I am not clear on that, even after hearing the discussion. I would insert the word "engineer" there along with the word "inspector." All the inspectors on our work are technical civil service men, and they are under the supervision of an assistant engineer, who is in charge of their work at the time.

Under the State law their acceptance of work does not bind the State at all. They are there to do the best they can and see that the work is properly executed. The inspector never passes on any of our work for final acceptance.

MAJOR GILLETTE (*President*): I think the intent of this is the protection of the contractors. The supervising engineer may not be within one hundred miles of the job, and if the work is done under the supervisor of the officially appointed inspector, and it has been done the way he wanted it done, the inspector should give his final certificate. Of course, any officer superior to the inspector, i. e., any man having supervision over the inspector

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\* The JOURNAL, May, 1912.

himself, could give such a certificate, and it should be accepted.

MR. RIPLEY: In our work there is not one time in one hundred where that case would occur.

MAJOR GILLETTE (*President*): But the contractor's rights accrue when he has done the work as specified. The official or engineer should not have the right to tear out work done under the inspector's orders and expect the contractor to stand the loss.

MR. BOWMAN: You raise the same point I had to raise in Connecticut on my first highway job. There was a president engineer in charge of the work. He accepted the work, and because the contract required the "satisfaction of the State Highway Commission" I did not get the pay, as the latter was not satisfied with it.

MAJOR GILLETTE (*President*): We don't want "the satisfaction" or other emotions to contend with.

MR. BOWMAN: When you deal with a hair-splitting Corporation Counsel anxious to establish a reputation, or for other reasons, you realize that the word "engineer" is absolutely required in this State.

MAJOR GILLETTE (*President*): We should say "the inspector or other official charged with the responsibility of the detail of the work" as it goes on.

MR. RIPLEY: I do not know whether you thought about the human being when you wrote this. You have got to recognize that fellow every trip.

MAJOR GILLETTE (*President*): This is a proposed general law. I take it that you understand something about the army law. It is made to fit the enlisted man whether he comes from a millionaire's family or from the lower East Side.

MR. RIPLEY: But this is not a military organization, and I do not think you can pass a law fixing any definite amount, fixing the minimum under which officers should let contracts of all classes and sizes. Now, because Mr. Ward in Buffalo did a great injustice to the people of Buffalo by some work under his \$500 limit, I do not think that proves the \$500 limit was wrong. I think it proves the people of Buffalo are asleep, and if they are satisfied with him it is their own lookout.

He is a fine gentleman to meet socially, I understand, and if the Buffalo people and the people in Pennsylvania are willing to keep such men in office, I do not think that should be reason for limiting the men in charge of contract work to \$100 or \$10,000. Ten thousand is a large sum on a small contract, and nothing on a million dollar contract. The City of New York and the State of New York are letting contracts for \$6,000,000 or \$8,000,000 each. Now, to limit the officers on that work to an expenditure of \$500 or \$10,000 puts a hardship on the contractor and the engineer alike. To-day we are reaching the point where we think the engineer and the contractor no longer mistrust each other; they feel that they both are trying to do a good piece of work.

As a young man I was taught that the contractor was a rascal anyway. Now I find that the bigger the contractor, the easier I get along with him. I believe that limit of one hundred dollars is too low. In work where I have been personally engaged we could have hastened the work and pushed everything along if the officials had the authority to exceed that sum. It is a question of demand. If we are not going to have honest officials I do not believe you can get honest work if you limit the amount to fifty cents. I think that the limit of \$100 will do more harm than good.

MAJOR GILLETTE (*President*): The limit of the argument relative to the human element is this: Take off the restrictions and let the engineer do as he pleases and that puts it to a *reductio ad absurdum*—you must have some restrictions. My idea is to go to the other extreme and to specify everything distinctly and completely. It is not fair to the community which has no official investigator to expect it to know what Commissioners of Public Works are doing. The people of Buffalo do not want their money wasted any more than anyone else does. There is perhaps no individual who can afford to spend the money to find out the facts.

The Chamber of Commerce in Buffalo employed a committee to investigate for two or three months and make reports, and I was engaged on that with a gentleman now in the employ of the city of New York. We did the best we could, still the situation was not remedied. Not because the people were asleep, but

because they did not understand. When you have a political organization backing this sort of business, and when the newspapers are aligned on the side against the people—they get their share—you have a situation which must be met by radical means, and the inconvenience and expense of your not having a wide limit to spend funds as you please will simply keep these crooks out of office. It is a safeguard, although it looks like a handicap. I can do public work of any kind and anywhere and be perfectly comfortable with a \$100 limit.

When the Civil Service was put on the Army Corps we did what we could. We all appointed the best men we knew of, and we had to do it. We found it more convenient and satisfactory, and it gave better results than the previous system had given. You will find it a little inconvenient to work on a \$100 limit; but you will find some people who will divide a \$1,600 boiler into sixteen parts, so as to get each part within the \$100 limit. They will not do it so often as now, and it will look more ridiculous when exposed. It will lessen the danger of political engineers getting into these places and running them in the interest of political gangs. I would rather lose \$10,000,000 by floods than \$10,000 by corruption. So I say, put the limit at \$100. (Applause.)

MR. RIPLEY: I see your point, and presume it is the best one, but I wanted to state my experience, so that we might get this scheme more workable, if possible. We must have a workable arrangement. Sometimes specifications simply hamper things; they do not leave anything to the honesty of the man on the work.

MAJOR GILLETTE (*President*): You are getting two things a little confused. Our regulations apply to the official. You are bringing up an instance of extra rigid ridiculous specifications. Now, about the strongest weapon the crooked engineer has is a set of iron-clad specifications to do up the wrong man when they get him. Captain Carter's specifications were designed with that end in view, and to put out of business Venable and Hoke Smith in Georgia. Those specifications were so impossible of execution that when we came to carry them out we could do nothing, and so the chief engineer had to take the bull by the horns and modify them.

I am talking about laws that will prevent the engineer and the contractor acting in collusion.

MR. BAMFORD: I have been strongly opposed to the \$100 limit until recently, and this thought came to me: If we accept that \$100 limit and assume an emergency we get this condition: Under Section 86-D, paragraph (a),\* it provides that the price of any item exceeded by 20 per cent. the estimated quantity, the price shall be settled by arbitration. So looking at it from that standpoint, I have overcome my personal objection to the \$100 limit, as it seems there is little difference whether the minimum limit is for fifty cents or \$10,000.

MR. COLE: May I say a word to Mr. Bowman and to Mr. King? We have interlined one of these May numbers of the JOURNAL and left it with the Secretary, and that interlined copy of the changes may be used for discussion later on; but the time for the presentation of this law is here. Time is of great value to us now, we have been talking in circles this afternoon, and we have been trying to get everything in one contract, whereas it can be amended.

MR. WEMLINGER (*Secretary*): The following reports have been received from the various Technical Standards Committees. As the hour is late, I will only read them by title:

Committee A on Contracts, Wm. B. Bamford, Chairman; Committee A-1, on Public Construction Contracts, Wm. B. King, Chairman; Committee F-6, on General Legislation, Wm. B. King, Chairman; Committee C, Standard Specifications on Construction Work, DeWitt V. Moore, Chairman; Committee C-16, on Hydro-Electric Construction, E. H. Abadie, Chairman. There is some correspondence from Mr. Langhead of Committee C-20, on Tunnels, Committee D-1, on Cost Analysis, DeWitt V. Moore, Chairman; Committee C-10, on Railway Maintenance, E. T. Howson, Chairman; Committee G, on Arbitration, E. H. Abadie, Chairman.

I think we have reason to congratulate the various committees on their reports.

\* The JOURNAL, May, 1912.

I move a vote of thanks to the chairmen of the various committees who have responded so well to our various requests. (Motion seconded, stated and carried.)

MR. BAMPFORD: I move that we thank Mr. Bowman for his very able and interesting address just presented. (Motion seconded, stated and carried.)

MAJOR GILLETTE (*President*): If there is no further business before this meeting we will now adjourn until eight o'clock this evening.

*Adjourned to eight o'clock.*



FOURTH ANNUAL MEETING  
OF THE  
AMERICAN SOCIETY OF ENGINEERING CONTRACTORS

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EVENING SESSION

President, CASSIUS E. GILLETTE in Chair

MAJOR GILLETTE (*Chairman*): The first thing on the program to-night is the announcement of the newly elected officers for the coming year.

The officers elected for 1913 are as follows:

*President*—Howard J. Cole.

*First Vice-President*—Edward Wegman.

*Second Vice-President*—George Thomas Clark.

*Directors*—Leon F. Peck, DeWitt V. Moore, Arthur S. Bent.

I want to say that it gives me a great deal of pleasure personally to know that Mr. Cole has been elected President. I am almost ashamed to say that because of my frequent absence from my office, he has had to perform most of the duties of President during the last year. Therefore, now I am glad to know that next year he may also have all the honors of the position. Mr. Cole will now have the painful duty of making the customary address. I will resign the Chair in his favor. (Applause.)

PRESIDENT COLE: I am somewhat embarrassed, gentlemen, with the honor which you have placed upon me, for I think it should have been given to one more worthy, but I will try to fulfill the duties of the office. Of course, this is entirely unexpected, and I will have to speak extemporaneously. (Laughter.) Knowing that you will be very much interested in the paper of the evening, I will be very brief, and will confine myself to my notes.

Looking backward over the work of the Society for the past four years, there is very much to be proud of, in that we started practically from nothing, and have had what might be termed a phenomenal growth. The work that has been accomplished is of an extraordinary nature. The Society is growing in power

and influence, and has become recognized as the special meeting place for Contractors and Engineers to exchange views on subjects that are of mutual and vital interest to both.

Because of the multiplicity of societies that have been started during the past decade it was thought there was hardly room for another society, but the field chosen by us is one that has been avoided by all the other technical societies. The scope of this Society is one that appeals particularly to Contractors in that its main object is the protection of the Contractor, the Engineer and the public from graft, collusion and fraud. In order to accomplish this purpose and to exert its protecting influence the main method of attack is first a standardization and uniformity of specifications, and the elimination from those specifications of all ambiguous phrases and unfair clauses granting discretionary powers to the engineer to the detriment of the work, the Contractor and the public interests. Our field, as you know, embraces all contract work of an engineering nature, and the reason for the existence of this Society to-day is the fact that the specifications governing most contract work in the past have been and some are now sadly in need of reconstruction. This fact has been particularly recognized by some of the other National societies, and efforts have been made along special lines for the elimination of the unfair clauses, but no general stand has been taken by any Society except this one.

The work done by us in 1912, along the lines of the paper that was presented to the Society by Major Gillette, has culminated in the drafting of a law which is practically ready for presentation to the Legislatures of the various States. This Law will have to be modified somewhat to meet local conditions, but it has been drafted as an amendment to the Municipal Law now in existence in the State of New York, with the idea of putting this amendment in force, thereby withdrawing from the specifications, advertisements, notice to Contractors and so forth, all ambiguity that might possibly be used as a means for fraud or graft.

This amendment to the Municipal Law has been under discussion to-day and as presented is practically perfect, or as nearly so as an Amendment can be drawn to meet the require-

nents of critical lawyers and legislators. The work has been carefully gone over, and it is surprising to find that the phraseology used in this amendment as printed in the *Journal* for May, 1912, has not been materially changed, although subjected to several legal examinations and criticised to-day by two or more lawyers in open discussion.

One other phase of the Society work that has been taken up largely is that of Cost Keeping and Cost Analysis of contract work. Up to a few years ago the average Contractor had but very little idea of the cost of his work, in that at the termination of his contract he only knew from the size of his bank account whether he had made money or lost money; but as to whether any particular unit of that work had cost more or less than it should have cost, he had no means of telling. In these days of keen competition the man who knows with a certainty just what each item has cost in the past is better able to bid for similar work; and this Society, therefore, stands as an advocate of whatever will tend to provide exact information for a Contractor on any or all of the elements that enter into the construction of an engineering proposition. It goes without saying that figures on any one contract are not directly applicable to another similar contract, even though it may be a duplicate of the first, because of varying conditions that distinguish one contract from another, topographically, climatologically, and so forth.

For the coming year's work we have decided to take up the standardization of specifications; and to that end an advisory committee has been formed and is called the "Technical Standards Committee." This Committee, with the Board of Directors, has gone through the membership of the Society and selected members who have had special experience along certain lines, and appointed them as the heads of these Committees. Under this Committee there are Sub-Committees. The personnel of these Sub-Committees and the topics assigned to them have all appeared in the last three or four issues of the *Journal*. Those who attended the afternoon session have heard some of the reports of these Committees, showing that very substantial progress has been made so far during the year 1912, although these Committees were not appointed until late in the Fall. It

is thought that at the end of 1913 practically all of these Committees will be able to present a complete report, and we will be able to publish at that time a set of uniform and standard specifications, covering practically the whole construction field. Some of the National societies have already entered into parts of this field, and have prepared standardized specifications on certain subjects. It is not the intention of this Committee to go over that same field and duplicate the researches and efforts of these other societies, but to take their work and bring it up to date, and add to it if necessary, and in that way there will be a conservation both of time and labor.

In this matter I ask for the hearty co-operation of each and every member of this Society, and if you have any personal knowledge or anything that you believe will be of service to the chairman of any one of these committees you will voluntarily submit the same to him.

There is one other point that I would like to speak of in closing, and that is the present method of nominating officers to this Society should be carefully discussed during the present year and modified. The method that has been in vogue for the past two or three years has been to nominate two men for each office. It is wrong to nominate two men for an office when you know that one must be defeated. I think that the membership of the Society should have enough confidence in its Nominating Committee to empower them to nominate one man for each office, and if there is any dissension over that nomination the Constitution provides a remedy by which ten members can nominate another candidate for the office. I trust that at the end of the coming year such a movement will have progressed, so that at the next Annual Meeting we can vote on that important change to the Constitution and carry it out.

Gentlemen, I thank you for the honor you have bestowed upon me.

(Applause.)

## FIRE AND FIRE PREVENTION

At the evening session of the Annual Meeting of the Society, held in New York City, January 14th, 1913, an interesting talk on "Fires and Fire Prevention" was given by Edward F. Croker, Ex-Chief New York Fire Department and President of the Croker National Fire Prevention Engineering Company. The address was illustrated by lantern slides, which pictured Mr. Croker's remarks in a most forcible manner.

At the conclusion Mr. William B. King moved a vote of thanks, which was most heartily given. In a later issue we shall publish Mr. Croker's paper.

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**Statement of the Ownership, Management, Circulation, etc., of "Journal of the American Society of Engineering Contractors" published monthly at New York, N. Y., required by the Act of August 24, 1912.**

*Editor*, JULIUS R. WEMLINGER - - 11 Broadway, New York, N. Y.

*Publisher*, American Society of Engineering Contractors, 11 Broadway, New York, N. Y.

*Owners*, American Society of Engineering Contractors (an unincorporated association).

Known bondholders, mortgagee, and other security holders, holding 1 per cent or more of total amount of bonds, mortgagee, or other securities: None

JULIUS R. WEMLINGER, *Secretary*.

Sworn to and subscribed before me this 20th day of June, 1913.

HERTHA WOELFLER

[SEAL]

Notary Public No. 101  
(My commission expires March 31, 1914)

# AN ACT TO REGULATE STATE, MUNICIPAL AND OTHER PUBLIC CONTRACTS FOR CONSTRUCTION AND FOR THE PURCHASE OF SUPPLIES.\*

AS REVISED BY THE COMMITTEE ON LEGISLATION.

1      The people of the State of New York repre-  
2      sented in the Senate and Assembly do enact as  
3      follows:

**Sec. I.**      4      This Act shall apply to all contracts for con-  
5      struction work and for the purchase of supplies  
6      by the State for any of its Boards, Commissions,  
7      or Officers, and to like contracts of Municipaliti-  
8      es, Boards, Commissions, and other bodies or  
9      officials charged with the expenditure of public  
10     money. The provisions of this Act shall not  
11     apply to contracts for personal services.

**Sec. II.**  
**Expendi-  
tures only  
by Con-  
tract.**      12     All expenditure of public money for public  
13     construction work or for supplies as aforesaid  
14     amounting to five hundred (\$500) dollars or  
15     more shall be made only by formal written con-  
16     tract awarded upon proposals submitted after  
17     public advertisement, as hereinafter provided.  
18     All expenditures amounting to more than one  
19     hundred (\$100) dollars and less than five hun-  
20     dred (\$500) dollars, and emergency contracts in  
21     amounts not exceeding one thousand (\$1,000)  
22     dollars may be made by an informal written pro-  
23     posal and acceptance awarded upon proposals  
24     submitted without public advertisement, provided  
25     that proposals shall have been obtained from at

\* As a result of Mr. William L. Bowman's valuable criticisms and suggestions in his paper on "Legal Questions Involved in the Proposed Amendment to the General Municipal Law of New York," published in the April issue of the JOURNAL, the Committee on Legislation held several sessions to consider a revision of the proposed amendment.

The Committee gave a most exhaustive and careful study to the original draft and revised practically every paragraph of it. The Act as now submitted conforms to the best legal requirements, and in the opinion of the Committee, avoids the defects of the original draft, as pointed out by Mr. Bowman.

A further announcement regarding the excellent work of this Committee will appear in the next issue of the JOURNAL.

1 least three responsible persons or corporations  
2 separately engaged in the regular business of per-  
3 forming the work or furnishing the supplies of  
4 the class required, and that all other proposals  
5 from all bidders shall have been duly considered  
6 in making such award. All expenditures amount-  
7 ing to one hundred (\$100) dollars or less may  
8 be made in the same manner, or upon an order of  
9 purchase, without first obtaining proposals there-  
10 for. A list of all such construction work to be  
11 done and supplies to be purchased without ad-  
12 vertisement, except emergency contracts, shall be  
13 posted in a conspicuous place in the office of the  
14 contracting authority at least five days in advance  
15 of the time set for awarding such contract or  
16 purchasing such supplies.

17 All proposals shall be recorded in a book of  
18 continuing record giving the names of the bid-  
19 ders, the amounts of the proposals and the dates  
20 upon which the proposals were made, and the  
21 unit prices and quantities purchased.

22 All contracts for such expenditures shall be  
23 accompanied by a sworn statement from the con-  
24 tracting authority that the work done or supplies  
25 furnished do not exceed a stated amount and that  
26 they have not been subdivided so as to evade the  
27 provisions of this Act. For emergency contracts  
28 they shall also state the nature of the emergency  
29 and the facts showing whether or not it could  
30 have been avoided by ordinary foresight. Any  
31 public official who makes an untruthful state-  
32 ment in this connection shall be guilty of a mis-  
33 demeanor.

34 All expenditures of public money for public  
35 construction or for supplies as aforesaid involv-  
36 ing an estimated cost of two thousand (\$2,000)  
37 dollars or more shall be advertised at least as  
38 follows:

**Sec. III.  
Adver-  
tisement  
for  
Contracts.**

1       (a) If by the State or any authority thereof,  
2 in one paper each having the largest sworn cir-  
3 culation, in New York City, Albany, Buffalo,  
4 and in the county in which the construction work  
5 is located or the supplies are to be used.

6       (b) If by a Municipality or any authority  
7 thereof, or any other bodies or officials, in the  
8 two local papers of the Municipality having the  
9 largest sworn circulation.

10     (c) And in all cases, in addition to the afore-  
11 said, in one technical, trade or municipal journal  
12 of suitable character. These advertisements shall  
13 begin to run four weeks in advance of the day  
14 set for the opening of the bids. In dailies it shall  
15 appear for six consecutive numbers of the publi-  
16 cation. It shall appear again once or twice just  
17 before the date of opening.

18     Contracts for less than two thousand (\$2,000)  
19 dollars and more than five hundred (\$500) dol-  
20 lars, except in emergencies as aforesaid, shall be  
21 advertised in one local paper having the largest  
22 sworn circulation in the county in which the con-  
23 struction work is located, or in which the supplies  
24 are to be used, and shall begin to run at least  
25 two weeks in advance of the day of opening of  
26 bids.

27     No contract shall be advertised, (1) until funds  
28 approximating in amount the cost of the proposed  
29 purchase or construction have been made legally  
30 available for the purpose, and (2) until the pro-  
31 posed contract documents are complete and ready  
32 for distribution. All such advertisements shall  
33 be posted from the first day of publication until  
34 after the opening of bids in a conspicuous place  
35 open to public inspection in the office of the con-  
36 tracting authority. All Officials, Boards, Commis-  
37 sions, or Departments of the State or of any  
38 Municipality who are charged with the making of

1 contracts or the purchasing of supplies shall keep  
2 in their respective offices various classified lists  
3 of contractors or dealers likely to bid who request  
4 that their names shall be placed thereon; these  
5 contractors or dealers shall be sent by mail copies  
6 of the advertisements as soon as they begin to  
7 run.

**Sec. IV.**  
**Contract**  
**Docu-**  
**ments.**

8 The following shall constitute the contract  
9 documents for every contract, viz., the adver-  
10 tisement or invitation for proposals, information  
11 for bidders, the proposal or bid, the specifica-  
12 tions and drawings, the bond and the contract  
13 proper. The advertisement or invitation for  
14 proposals shall contain a notice of the kind of  
15 work or materials wanted, the funds available  
16 for it, the time and place of the opening of the  
17 proposals, and the places where information and  
18 the proposed contract documents can be obtained.  
19 The information for bidders shall cover all in-  
20 formation necessary to the intelligent prepara-  
21 tion and submission of a proposal. The specifi-  
22 cations and drawings together shall contain a  
23 complete, specific and explicit detailed descrip-  
24 tion of the construction work or of the supplies.  
25 They shall describe the materials to be used,  
26 the methods to be followed, the workman-  
27 ship to be required, the tests to be made, the de-  
28 fects which will cause rejection, and any and all  
29 other information necessary for a contractor to  
30 prepare an accurate estimate for the construction  
31 work or supplies and to properly construct the  
32 work or furnish the supplies as specified. The  
33 specifications shall not contain any general condi-  
34 tions of the contract. The contract proper shall  
35 contain the formal executed agreement and pro-  
36 visions relating to the rights, duties and obliga-  
37 tions of the contracting parties, but shall contain  
38 no specifications whatsoever. The contract docu-

1       ments aforesaid shall be signed in duplicate; one  
2       copy shall be delivered to the contractor, and one  
3       copy shall be immediately filed in the office of the  
4       contracting authority and shall remain on file and  
5       shall not be altered.

6       Anyone may secure a copy of the proposed con-  
7       tract documents upon payment of a price which  
8       shall not exceed the actual cost of such copy.  
9       There shall be no other requirements nec-  
10      essary to obtain them and said payment shall be  
11      refunded upon their return after the opening of  
12      bids.

13      A copy of the proposed contract documents  
14      shall at the time when the advertisement begins  
15      to run be filed in the office of the contracting au-  
16      thority and shall be duly certified and shall remain  
17      on file and shall not be altered thereafter.

18      Each proposal shall be enclosed in an envelope  
19      stating thereon the work covered by proposal and  
20      the date of opening. This envelope shall be en-  
21      closed in another envelope.

22      Proposals essentially in the form prescribed by  
23      the provisions of this Act shall be retained and  
24      opened in public at the time and place stated in  
25      the advertisement, but not before said time. Af-  
26      ter the opening of the proposals the public shall  
27      have the right to inspect same for a reasonable  
28      length of time in the presence of the official in-  
29      viting same, or of a properly appointed assistant.  
30      No change of words, figures, or marks of any kind  
31      shall be made upon a proposal by any person  
32      after it is opened. The award must be made to  
33      the lowest bidder at the time and place of the  
34      opening of the proposals, or as soon as the pro-  
35      posals reasonably can be computed. Every pro-  
36      posal shall be accompanied by a certificate check  
37      drawn upon some legally incorporated bank in  
38      this State, or by legal tender or by a bond of a

**Sec. V.  
Proposals.**

1 bonding company authorized to do business in  
2 this State, for five per centum of the amount of  
3 such proposal as a guaranty that the bidder will  
4 enter into the contract if it is awarded to him.  
5 If the lowest bidder fails to execute the contract,  
6 the said check, legal tender, or bond shall be for-  
7 feited as liquidated damages and the contract shall  
8 within a reasonable time be awarded to the next  
9 lowest bidder. If only one proposal is offered, no  
10 award shall be made, and the contract shall be re-  
11 advertised.

12 All such checks, legal tender, or bonds shall be  
13 returned to the bidders immediately upon the  
14 award, except the check, legal tender, or bond  
15 of the two lowest bidders which shall be returned  
16 to them upon the signing and delivery of the con-  
17 tract documents.

**Sec. VI.  
Bonds.**

18 A bond shall be furnished in connection with  
19 every contract herein provided for, of not less  
20 than ten (10%) per cent. nor more than thirty-  
21 three and one-third (33 1/3%) per cent. of the  
22 estimated amount of the contract and otherwise  
23 in accordance with the provisions of the Lien  
24 Law, Section 62, relating to public contracts (law,  
25 1911, chapter 450, article 3-A).

**Sec. VII.  
Contract  
Provi-  
sions.**

26 (a) The contract documents shall be clear and  
27 free from repetitions. Words shall be used in  
28 their meaning as defined in Webster's Dictionary.

29 The contract documents shall be so worded and  
30 all the arrangements and management concern-  
31 ing bidding shall be such that all bidders shall be  
32 bidding upon fair terms for exactly the same con-  
33 struction work or the same supplies, and on terms  
34 of exact equality as to advantage or disadvantage.

35 (b) Neither the contract documents nor the  
36 management of the bidding shall require any per-  
37 son or corporation to disclose the fact that he or

1 it contemplates bidding or has any interest in a  
2 coming bidding.

3 (c) A full copy of contract documents shall  
4 be easily available to the public in the immediate  
5 vicinity of the work at all hours when work is be-  
6 ing prosecuted in that locality.

7 (d) The contract shall provide that if differ-  
8 ences arise as to the construction of the contract  
9 documents or as to any matter or thing arising  
10 thereunder, such differences shall be adjusted  
11 forthwith by the engineer, architect or other per-  
12 son designated by the contract proper subject to  
13 appeal to arbitration within twenty days. The  
14 contractor shall select an arbiter, the contracting  
15 authority another, and these two shall select a  
16 third. If the contractor and the contracting au-  
17 thority mutually agree, one arbitrator may be ap-  
18 pointed in place of the three named above.

19 In case either party refuses to appoint an arb-  
20 iter, or to agree on a single arbitrator, within  
21 seven days after the receipt from the other party  
22 of a written demand for arbitration of any stated  
23 matter, or if the arbiters selected do not within  
24 ten days choose the third arbiter, the contractor  
25 shall carry on the work or furnish the supplies as  
26 directed by the proper official subject to future  
27 adjustment by the proper court without the loss  
28 of any right to either party from such direction  
29 or its acceptance.

30 In case of emergency, to be determined by the  
31 engineer or other officer in charge, the contractor  
32 shall proceed as required by such engineer or  
33 other officer subject to final determination of the  
34 rights of the parties as hereinbefore just provided.

35 (e) No contract shall call for the retention of  
36 any time of more than ten (10%) per cent. of  
37 the credits for the work done or supplies fur-  
38 nished to date.

1        (f) No provision in the contract proper pro-  
2 viding either in express words or in substance and  
3 effect that an award or appraisement or estimate  
4 of engineer, architect or other person shall be final  
5 or conclusive, and no provision that a certificate  
6 or satisfaction of an engineer, architect or other  
7 person or official shall be a condition precedent to  
8 maintaining an action on such contracts, shall  
9 prevent the arbitration hereinbefore provided for  
10 or oust the jurisdiction of the courts. Any con-  
11 troversy arising thereunder may be adjusted by  
12 the engineer, architect, or other person designated  
13 in the contract proper subject to arbitration as  
14 provided for herein or subject to due course of  
15 law.

16        (g) The terms "discretion of the engineer,"  
17 "judgment of the engineer" or their equivalents  
18 calling for their exercise after the opening of pro-  
19 posals shall not appear in the contract documents  
20 unless they be accompanied by full explanation  
21 showing exactly how they will be exercised in  
22 the event of any of the contingencies happening  
23 to which they refer.

24        (h) The contracting authority shall assume  
25 responsibility for all physical conditions as repre-  
26 sented in the contract documents or in any maps,  
27 plans, borings, or other like data furnished for  
28 the information of bidders.

29        (i) If the physical conditions of the work are  
30 found to be different than as represented in the  
31 contract documents, whereby a greater or less  
32 cost to the contractor is caused, the contractor  
33 shall be entitled to reasonable compensation for  
34 such work, subject to arbitration as herein pro-  
35 vided for.

36        (j) No contract shall require the contractor  
37 to construct the work according to definite meth-  
38 ods and with specific materials and at the same

1 time be responsible for the accuracy and suffi-  
2 ciency of such methods or materials to accom-  
3 plish specific results, or to warrant the endurance  
4 of such work, or to be responsible for the repairs  
5 for any specified length of time.

6 (k) Contracts for construction work shall not  
7 include the furnishing of any supplies beyond  
8 those actually used in the construction work ex-  
9 cept essential appurtenances and necessary fix-  
10 tures.

11 (l) The specifications in all contracts for con-  
12 struction work to be let at unit prices shall con-  
13 tain an official estimate of the classes of work to  
14 be done, of the amount of each class of work or  
15 material, of the cost of each unit on which com-  
16 pensation is to be based, and of the total cost of  
17 the work, and the bids shall be made upon the  
18 basis of such units. No bid aggregating more  
19 than twenty-five (25%) per cent. beyond the total  
20 estimate of cost will be accepted. The lowest bid  
21 shall be determined by multiplying the unit prices  
22 bid by the quantities of each unit, officially esti-  
23 mated, and adding the quotients.

24 If in the execution of the work it be found that  
25 any item will exceed in quantity the estimate, then  
26 such excess work not to exceed twenty (20%)  
27 per cent. of the estimate shall be completed by the  
28 contractor. For such excess work he shall be  
29 entitled to receive actual reasonable cost plus ten  
30 (10%) per cent. profit. Should the actual  
31 amount of work be less than the estimated quan-  
32 tity, the contractor shall receive the unit price for  
33 the amount actually done and ten (10%) per  
34 cent. of the unit price as anticipated profits on  
35 not to exceed twenty (20%) per cent. deficiency  
36 in the estimated quantity.

37 (m) In purchasing supplies for future use  
38 completed schedules of the estimated amounts of

1 each shall be published together with full specifications for every item. Provision must be made  
2 for receiving bids on any one or more items.  
3 Awards must be made to the lowest bidder for  
4 each item.

5 (n) Where results can be obtained only by  
6 the purchase of articles, so covered by a monopoly  
7 that competition is impossible, such articles may  
8 be purchased provided the contracting authority  
9 makes affidavit to that fact, and provided the per-  
10 son or parties furnishing the said articles shall  
11 file with the purchasing official an affidavit stating  
12 that the price is as low as that to the most favored  
13 customer for similar quantities, under similar  
14 conditions.

**Sec. VIII.  
Execution  
of  
Contract  
Work.**

16 In the execution of contracts for construction  
17 work or supplies, the necessary number of com-  
18 petent inspectors shall be appointed by the proper  
19 authorities to see that the provisions of the con-  
20 tract documents are adhered to. Upon the com-  
21 pletion of the work or the delivery of the supplies,  
22 the engineer or other officer in charge shall forth-  
23 with certify that the work has been properly and  
24 completely performed or the supplies furnished in  
25 accordance with the contract. Such certificates  
26 shall be *prima facie* evidence of performance.  
27 This certificate approved by the contracting au-  
28 thority shall relieve the contractor of all further  
29 responsibility except in cases of fraud or col-  
30 lusion.

**Sec. IX.  
Viola-  
tions.**

31 Any violations of the provisions of this Act  
32 committed by the contractor will render the con-  
33 tract null and void, but he shall be entitled to  
34 receive a sum equal to the difference between the  
35 contract price and the actual reasonable cost of  
36 completing the contract work, plus 10% profit,  
37 or the actual reasonable cost of labor and mate-  
38 rials furnished whichever amount is smaller.

1       Any violation of the provisions of this Act com-  
2 mitted by the contracting or other authority of  
3 the State or Municipality shall render the con-  
4 tract null and void. If the contractor at any time  
5 before complete performance takes advantage of  
6 any violation and ceases work he shall be entitled  
7 to receive a sum equal to the difference between  
8 the contract price and the actual reasonable cost  
9 of completing the contract work or the actual  
10 reasonable cost of labor and materials furnished  
11 plus ten (10%) per cent. profit whichever amount  
12 is smaller. If the State or Municipality at any  
13 time before complete performance takes advan-  
14 tage of any violation and abandons or discon-  
15 tinues the work for a period of more than thirty  
16 days then the contractor shall be entitled to re-  
17 ceive the actual reasonable cost of labor and ma-  
18 terials furnished with ten (10%) per cent. profit  
19 added thereto.

20      In either of the above cases if the work is en-  
21 tirely performed by the contractor he shall be  
22 entitled to the full contract price as though there  
23 had been no violation.

24      Any official violating any of the provisions of  
25 this Act shall be guilty of a misdemeanor. The  
26 failure to award the contract to the lowest bidder,  
27 whose bid is in compliance with the provisions of  
28 this Act, shall entitle him to recover as damages  
29 an amount equal to the bond to secure the execu-  
30 tion of the contract.

31      Any citizen of the State and any corporation  
32 authorized to do business in the State shall have  
33 the right of injunction in the proper court to re-  
34 quire prompt compliance with this law, and such  
35 citizen or corporation shall have the further right  
36 to appear as a party in interest in any suit be-  
37 tween the contractor and the official whenever the  
38 matter of any public contract as herein provided

1 for comes before the court, together with the  
2 further right to appeal to the proper court, from  
3 any decision made by arbitrators appointed under  
4 the provision of this Act.

**Sec. X.  
Special  
Rulings.**

5 If in the execution of this law, the work of the  
6 official or the contractor is unduly hampered by  
7 the public or otherwise, special rulings and regu-  
8 lations may be made by the court upon proper pre-  
9 sentation of the matter.

**Sec. XI.**

10 This act shall take effect immediately.

**Sec. XII.**

11 All laws or parts of laws in conflict with this  
12 Act are hereby repealed in so far as such conflict  
13 may exist.

**Sec. XIII.**

14 This Act shall be known as the Public Contract  
15 Act.



# A Reputation Behind It

# A Future Ahead of It

## THE BITULITHIC PAVEMENT

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BITULITHIC construction is made of the best material and is built to wear. BITULITHIC is the nearest to the Ideal pavement that has yet been devised. BITULITHIC is a sanitary, dustless, non-skidding pavement, and affords a secure foothold for horses.

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WARRENITE has proven to be the best country road surface and most economical. WARRENITE is a sanitary, dustless, non-skidding roadway and affords a secure foothold for horses.

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# AMERICAN SOCIETY OF ENGINEERING CONTRACTORS

11 BROADWAY, NEW YORK, U. S. A.

PAPER NO. 50

## BITUMINOUS CONCRETE PAVEMENTS

BY

Wm. B. SPENCER.\*

(Member of the Society.)

The title of the paper which I have prepared for you this evening is very much like charity, in that it covers a multitude of sins from the standpoint of the paving engineer and contractor, who will stand at the beginning of the year 1913 and look backward on the vast seas of distress over which the hardy engineer-contractor has attempted to pilot his craft to a successful haven. The end of his voyage is not yet in sight, although his experience during the past few years has been along lines which teach us more what to avoid than what to adopt.

Up to the time of the advent of the automobile the question of modern highways was pretty well solved, except in the more highly-trafficked streets of our great cities, by the discoveries of John Macadam, and the more recent improvements of the French engineers and the pioneers of this country. But the pioneers did not contemplate in their system of road building heavy vehicles carrying loads of from one thousand to twenty-thousand pounds and passing over their prepared roadbed at the rate of from five to fifty miles an hour, sucking up the carefully placed filler or binder, and depositing it over our lawns, our farms and in our houses, permeating the entire atmosphere with a dust which was both objectionable and unhealthy. An immediate cry of protest was heard throughout the land, and engineers at once attempted to solve the puzzling problem. In the West temporary

\* President of the Continental Public Works Company, New York City, N. Y.

relief was found by taking the crude natural asphaltic or semi-asphaltic oils of California, Texas and Kansas and sprinkling them over the macadam roadways. This generally gave temporary relief from the dust nuisance, but it was found that these oils, which had not gone through the process of refining, contained many substances which were detrimental to the automobile tire. It was also found that they had a decidedly bad effect on the binding materials of the macadam roadways. A well bound macadam roadway secures its cohesiveness by the hydration of its granular constituents, but when the surface coat is more or less thoroughly sealed by the application of a heavy oil, then the body of the mass is denied the water which prolongs its life, and shortly thereafter the road will commence to ravel.

Some time during the year 1903 an observer in the oil regions of California noted that a flock of sheep, which had been driven back and forth to pasture, over an oil saturated piece of ground, gradually consolidated this soil to such a degree of hardness that it was not affected by vehicular traffic, and also produced a highway which was cheap and did not require the use of stone, which had always been deemed necessary for the construction of highways. A tamping roller, made as nearly as was mechanically possible to imitate the sheep's foot action on the soil, was designed, and the "Petrolithic" or tamped road was launched. In some sections of California it met with fair success, and is still in limited use in that section of the country.

In the summer of 1907 a road of the same type of construction was laid near New York City, and during the summer and fall season of that year it withstood traffic conditions remarkably well, but during the early winter frost penetrated the road and immediately thereafter a warm rainy period ensued, with the result that the road rapidly disintegrated and became a quagmire. The following spring it was found necessary to entirely remove the prepared roadway and substitute another form of road construction.

The Petrolithic specifications were substantially as follows:

The earth roadway to be improved shall first be cleared of all vegetable and other foreign materials and shall then be

crowned with a road grader, or by hand, to the proper line and grade, filling in all low places with suitable material. It shall then be plowed to a depth of not less than eight inches, after which a disc-harrow shall be run over the surface of the plowed roadway in order that all lumpy material shall be disintegrated. The road shall then be carefully graded to the required cross section, after which there shall be distributed one gallon of hot asphaltic oil to the square yard of pavement. The sheep's foot or tamping roller shall then be used until its teeth refuse to penetrate into the soil for a distance of more than one inch. The material shall then again be lightly harrowed and an application of hot asphaltic oil, at the rate of not more than one-half gallon to the square yard, shall be applied, and the surface shall then be lightly harrowed, after which the tamping roller shall be again used until the teeth refuse to penetrate. The surface shall then be covered with a coating of stone chips or sand and rolled with light circular roller.

Other experiments with the same or allied processes were made in the east during the ensuing year with no better results, and in so far as this type of construction is concerned, I believe that it has been virtually abandoned outside of California.

Various states and municipalities then attempted to improve on the water bound macadam and its filler of stone chips by substituting heavy asphaltic or semi-asphaltic oil, by means of what is termed the penetration or grouting method. The initial process relating to the preparation of the base and first course of stone was substantially the same as in the preparation of the water bound type of macadam. The second course, generally composed of what is known as inch and a half stone, was then spread upon the base course and rolled with a ten ton roller to an average thickness of about four inches. An application of asphaltic oil, heated to a temperature of approximately 300 deg. F., was applied, at the rate of one and one-half gallons per square yard, by means of pouring pots or sprinkling wagons and immediately thereafter a coating of stone chips was applied and the surface was then again carefully rolled with a steam roller. Immediately after this rolling another application of hot oil was

made at the rate of approximately one-half gallon to the square yard, and another course of stone chips applied, after which the surface was again rolled, and after a short period of time, ranging from three to twenty-four hours, the road was opened to traffic.

The success of this type of pavement is somewhat problematical, and has been abandoned in many places. The States of New York and New Jersey spent many millions of dollars in this type of road construction during the seasons of 1910-1911, but during the season of 1912 the use of this type of construction was almost entirely abandoned. In order to make a success of this type of construction it has been found necessary to have almost ideal climatic conditions. A working temperature of over 55 degrees F. has been found necessary because in a lower temperature the stone becomes so cold that it immediately chills the asphaltum when applied and prevents it from thoroughly penetrating the voids in the mass; an unstaple top surface coat is thus formed with an under strata which is poorly consolidated. Traffic soon finds the weak spots in this pavement, with the result that ravelling soon begins and the complete disintegration of the pavement is only a matter of a short time. In order to secure even fair results from penetration work, I have found the following conditions to be absolutely necessary.

*First:* An asphaltic oil of approximately 18 Beaume gravity at 77 degrees F. A flash point of not less than 400 degrees F. A fixed carbon total of not more than 6 per cent. A bitumen contents of not less than 99 per cent., and a paraffine scale residue of not more than 3 per cent. This material should be heated and applied at a temperature of not less than 300, or more than 350 degrees F. The temperature of the air should not be less than 60 degrees F. The mineral aggregate should be bone dry and the asphaltic oil should be applied to the surface by means of sprinkling appliances containing an exact quantity of the material; templates, or other means of determining the exact quantity of oil to be applied per square yard of roadway should be laid on the prepared road surface, in order that an even distribution of the oil may be secured.

Power sprinkling devices employing compressed air as an atomizer have been used with fair results, but the continued decrease of this method of construction in favor of some method of the mechanical mixing of the cementing medium and the mineral aggregate, is proof evident that at its best the penetration system is only a step in the right direction from the water bound macadam era to the present era of mixed bituminous surfaces.

The present situation in so far as mechanical mixed methods of construction are concerned, is one which has many regrettable features, due to a great extent to a decision handed down by the United States Circuit Court of Appeals, in the well-known Owasso case of the Warren Bros. Co., vs. the Barber Asphalt Paving Co., in which the claims of the Warren Bros. Co., patent No. 727,505 were adjudicated in favor of the plaintiff. The result of this decision and of more recent decisions bearing on the same patent have unfortunately been the cause of a great deal of uncertainty among paving engineers as to the best method of construction which would not infringe on these patents and still give a pavement which meets the requirements of modern traffic conditions. I do not propose this evening to discuss the patent litigation covering the above decision, as Mr. Warren, the President of the Warren Bros. Co., and a member of this Society, is better qualified to present his side of the question than I am. It is my intention, however, to present to you some of the types of mixed bituminous pavements, which, according to my understanding, do not conflict with the Warren Brothers' patent.

#### BITUMINOUS MACADAM.

This type of pavement has been adopted by some of the State Highway Departments for use on main travelled highways and also on the principal streets of some smaller towns. I submit herewith a specification of this type of pavement as prepared by the State Highway Department of Pennsylvania.

"After completion of the bottom course, telford or macadam, the bituminous macadam course is to be placed thereon. It shall consist of a mixture of bituminous material and good hard

stone acceptable to the State Highway Department, trap rock preferred. When trap rock is used the stone shall be of such size as will pass through a two-inch ring and be rejected by a half-inch ring, and shall be entirely free from dust. When limestone is used it shall be of such size as shall pass through a three-inch ring and be rejected by a one-inch ring. When asphalt is used it shall contain not less than 90 per cent. bitumen and shall be heated to a temperature of 350 to 400 degrees F. When tar is used it shall be heated to a temperature of 270 to 325 degrees F. The bituminous material shall be mixed with the stone in a mechanical mixer and then spread on the telford foundation to a depth of five inches in the center for a width of six feet, and to a depth of four inches on the sides, loose measurements, and thoroughly rolled and compacted. One and five-tenths (1 5/10) gallons to two (2) gallons of bituminous material per square yard of road surface will be required to make the mixture. The contractor shall, upon the direction of the engineer in charge, heat the stone to a temperature of 250 to 300 degrees F. before mixing the compound. After the above mentioned course has been thoroughly rolled in place and compacted with a ten-ton roller, to the satisfaction of the engineer or inspector in charge, and the surface swept clean, the surface shall be painted with the neat bituminous material, using five-tenths of a gallon per square yard of road surface, unless otherwise directed by the engineer. Immediately following the flush coat or painting there shall be applied a coating of clean rock screenings,  $\frac{1}{4}$  to  $\frac{3}{4}$  inch in diameter, of the same material as has been used in the four inch course, to a depth of one-half inch and rolled into the voids in the surface. Should the bituminous binder appear on the surface after rolling, enough additional rock screenings must be applied to take up the surplus material."

This type of construction is one which, in my mind, leaves considerable to be wished for. Personal experience has led me to believe that the grading of the mineral aggregate is not done with sufficient care to give a minimum of voids in the mass, with the result that, it is my opinion, depressions and ravelling are apt to occur in a period of not more than three years after the pavement is laid.

## BITUMINOUS CONCRETE TOPEKA SPECIFICATIONS.

This type of construction is one which was agreed upon in the case of Warren Bros. Co., vs. Kaw Paving Co., and City of Topeka, Kansas, as a specification which did not infringe on the patents of the Warren Bros. Co., and has been so admitted by Mr. George Warren in a statement made by him before the annual convention of the A. S. M. I., at Grand Rapids, Mich., (see proceedings of the eighteenth annual convention, page 88), and in another statement in which he has stated, "We have no quarrel with this class of construction."

The specifications covering this type of construction are no doubt familiar to some of you and will not be given here in detail. In a general way, however, the court held that a grading of mineral particles ranging from material which passed a 200-mesh sieve to a maximum amount of from 5 per cent. to 11 per cent., to particles which passed in a 2-mesh sieve to a maximum amount of 10 per cent., did not infringe on the patents of the Warren Bros. Co. This decision had a far-reaching effect, as it made possible for engineers to specify and contractors to bid on a graded bituminous bound pavement without conflicting with the patents of the Warren Bros. Co.

Where this pavement has been laid with care and by experienced contractors it has met with extreme success, and is being specified in ever increasing quantities in all parts of the country. During the season of 1912 the City of New York, Borough of Queens, awarded contracts for the construction of over one million five hundred thousand square yards of this type of pavement in the aforesaid Borough. The highways on which this pavement is laid are the main arteries of travel leading to and from Greater New York points on Long Island. Over eighty per cent. of this travel consists of pleasure automobiles and heavy auto trucks, and a majority of the remainder being heavy horse-drawn farm wagons. A traffic census taken on the Merrick Road this summer showed an average of over six thousand vehicles a day, with a daily total of approximately ten thousand vehicles passing over it on Saturdays, Sundays and holidays.

The pavements have been down for too short a time yet to be able to judge of their future wearing qualities, but the fact

that they have gone through the past season with excellent results is, to my mind, evidence of the fact that they will bear the heavy traffic imposed upon them for many years to come without the necessity of any large amount of repairs. The old roadbed consisted, in the majority of cases, of old macadam, which had been worn down to the base course of stones. This course was lightly scarified and sufficient  $1\frac{1}{2}$ -inch stone was added to bring the road to the proper cross section and crown, and two inches below the finished grade. A layer of screenings or sand was then applied and worked into the voids by means of hand brooms and puddling with water, and the whole foundation was then thoroughly rolled with a ten-ton macadam roller. The bituminous concrete was then laid and raked by expert rakers and then thoroughly rolled with a six ton tandem roller until it had an ultimate thickness of two inches. The pavement was then dusted with a coat of Portland Cement to fill any surface pores and was opened to traffic after a period of not less than twelve hours.

In order that the shoulders of the roadway should be protected, a layer of three rows of vitrified block were butted in against each side of the roadway and the joints were then poured with an asphaltic filler. In the outlying sections the wings of the roadway were carefully graded and suitable gutters were constructed leading to masonry seeping basins. In sections where storm water sewer systems prevailed the gutters were paved with either cobble or brick and the construction extended from curb to curb.

Among the other forms of modern bituminous pavements may be mentioned those which come either under the patents or control of the Warren Bros. Co., and consists of the well-known Bithulithic pavement, Warrenite and Amesite, which latter pavement is, I understand, claimed to be an infringement on the Warren Bros. Co., patent No. 727,505, and the users are therefore paying a royalty to the Warren Bros. Co. It is not my intention to discuss these pavements, as their merit has already been presented to you for consideration.

There is also another type of pavement which has recently come into vogue in the Middle West, and is also being used in some parts of the East. It bears the trade name of "Dolarway"

pavement, but I understand that it is also being laid in various parts of the country, without the use of the trade name. This process consists of first laying a concrete base of suitable thickness of rather a rich mixture and providing suitable expansion joints. Immediately after the laying of the concrete and before the initial set has taken place, the top of the concrete is carefully trowelled, in order to have a uniform finish, and to bring the finer particles to the surface, after which the surface is broomed. Upon this foundation there is spread a layer of hot bitumen at the rate of about one-third gallon to the square yard, immediately after which a uniform layer of clean dry sand or stone screenings is spread in a sufficient quantity to cover the asphalt coat and leave a wearing coat not less than  $\frac{1}{4}$  inch in thickness. This pavement is at the present time in its infancy and it is therefore impossible to form an opinion as to its permanent quality. One good feature of this type of pavement, however, is the fact that irrespective of the wear of the surface course there always remains the concrete foundation which can be used either for a new application of this same type of surface treatment, or it can be used for another type of pavement.

#### SHEET ASPHALT.

This type of pavement has probably received more praise and at the same time more criticism than any other form of bituminous pavement, but in my opinion there is no more substantial bituminous pavement laid than modern sheet asphalt pavement. In the early days, and even in more recent times, paving engineers have given too little attention to the details which go to make up a good modern pavement of this type. This lack of attention to details is slowly being eliminated, due greatly to the fact that intelligent bodies of engineers and contractors have been working together to standardize the specifications covering this type of pavement. A set of standard specifications covering the making and laying of sheet asphalt, which is the result of many years study and labor, has recently been published

by the American Society of Municipal Improvement. A digest of these specifications may be of interest to the members of this Society.

#### REFINED ASPHALTS.

The tests provide that all penetrations shall be made at 77 degrees F., and are to be expressed in hundredths of a centimeter with a No. 2 needle acting for five seconds under a total weight of 100 grams. There is no distinction made between the so-called natural or lake asphalts and the oil asphalts; i. e., those derived by distillation from asphaltic oils, it being stated that all asphalts shall be prepared from a natural mineral bitumen, either solid or liquid, or a combination thereof, by suitable and approved methods of refining.

"All shipments of refined asphalt shall be uniform in consistency, and shall not vary more than 15 points in penetration at 77 degrees F. Ninety-eight and one-half per cent. of the total bitumen shall be soluble in carbon tetrachloride."

#### FLUX.

The specifications covering the fluxes state in part that they shall be the residue obtained by the distillation of paraffine, asphaltic or semi-asphaltic petroleum, and shall be of such character that they will combine with the asphalt to be used to form an acceptable and approved asphalt cement.

#### BINDER STONE.

The requirements are that the stone shall be clean, hard and free from any particles that have been weathered and are soft. It shall all pass a 1½-inch screen, and from fifteen to thirty per cent. shall pass a ten-mesh screen. Particular attention is called to the latter requirement. Strict conformation with this phase of the specifications will produce a dense binder which will have much to do with the ultimate life of the pavement.

## SAND.

The careful grading of the sand particles has received more study in recent years, with the result that the modern specifications are as follows:

200 mesh, 0 to 5%.
100 mesh and retained on 200 mesh, 10 to 25%.
80 mesh and retained on 100 mesh, 6 to 20%.
50 mesh and retained on 80 mesh, 15 to 40%.
40 mesh and retained on 50 mesh, 10 to 30%.
30 mesh and retained on 40 mesh, 8 to 25%.
20 mesh and retained on 30 mesh, 5 to 15%.
10 mesh and retained on 20 mesh, 2 to 10%.
8 mesh and retained on 10 mesh, 0 to 5%.

Particular attention is called to the large percentage of particles which must pass the 80-mesh sieve and the small amount which pass a 20, 10 and 8-mesh sieve.

It is unusual to find a sand which can comply with both the fine and the coarse requirements of these specifications. I am at present engaged in the laying of a considerable amount of sheet asphalt pavement under these specifications in the City of Norfolk, Va., and it has been found necessary to secure two sands in order to produce a blend which meets the requirements of the specifications. The fine grain sand is secured in the Dismal Swamp of North Carolina, and the coarse sand is secured by dredging in the Chesapeake Bay. A blend of three parts of the Dismal Swamp sand to one part of the dredged Chesapeake Bay sand produces a mixture which complies in every respect to the requirements of the standard specifications.

The exact quantities of materials used in making one nine cubic foot box of our Norfolk paving mixture are as follows:

Sand .....	880 lbs.
Carbonate of Lime....	170 lbs.
Asphalt Cement.....	127 lbs.
<hr/>	

1,177 lbs.

A nine foot-box of this mixture lays approximately 5.28 square yards of finished pavement two inches thick after com-

pression with a steam roller weighing not less than two hundred pounds per inch width of tread.

### ASPHALT CEMENT.

The requirements of asphalt cement are that it shall be composed of refined asphalt or asphalt and flux prepared in the proper proportions and melted in such a manner that they shall be blended into a homogeneous mixture complying with the following requirements.

- a.* It shall be thoroughly homogenous and shall not be oily to the touch.
- b.* It shall have a penetration between 40 and 75 at 77 degrees F., depending upon the sand and asphalt used and traffic upon the street on which the pavement is to be laid.
- c.* It shall not flash below 300 degrees F. when tested in a New York State closed oil tester.
- d.* When heated in an open tin at a temperature of 325 degrees F. for five hours in a hot air oven, it must not show a loss by volatilization of over 5 per cent. and the penetration at 77 degrees F. of the residue left after such heating must not be less than one-half of the penetration at 77 degrees F. of the original sample before heating.
- e.* When the pure bitumen of the asphalt cement is brought to a penetration of 77 degrees F. of 50 and made into a briquette having a cross section of 1 square centimeter it shall have a ductility of not less than 20 centimeters at 77 degrees F., the two ends of the briquette to be pulled apart at the uniform rate of 5 centimeters per minute.

When the asphalt cement as used has a penetration greater than 50 at 77 degrees F., an increased ductility of 2 centimeters shall be required for every 5 points in penetration above 50 penetration.

### BINDER AND LAYING.

The binder mixture shall be heated to a temperature of between 200 and 325 degrees and shall be mixed with from five to eight per cent. bitumen. On reaching the street it shall immediately be dumped on the concrete and at once spread with hot shovels and rakes to the required thickness, after which it shall be thoroughly rolled. No more binder shall be laid at any one time than can be covered by two days' run of the paving plant on surface mixture.

### WEARING SURFACE.

The sand and the asphalt cement shall be heated separately to such a temperature as will give, after mixing, a surface mixture of the proper temperature for the materials employed. The sand when used must be at a temperature of between 250 deg. F. and 375 deg. F. The asphalt cement when used must be at a temperature between 250 deg. F. and 350 deg. F. The filler shall be added to the hot sand in the required proportions, and the two thoroughly mixed. The A. C. in the proper portion shall then be added and the mixing continued for at least one minute.

### LAYING.

The surface mixture shall be brought to the street in wagons at a temperature between 230 deg. F. and 350 deg. F., and shall be covered with canvas covers while in transit. It shall then be dumped on a spot outside of the space on which it is to be spread. It shall then be deposited roughly in place by means of hot shovels, after which it shall be uniformly spread by means of hot iron rakes in such a manner that after having received its final compression by rolling, the finished pavement shall conform to the established grade and have a thickness of not less than, —— inches, (generally two inches).

Such are the specifications of the modern sheet asphalt pavement, and in closing there is one particular thought I would like to have you consider. The modern sheet asphalt specifications generally require a binder course from one to one and one-half inches in thickness, and a surface course from one to one and one-half inches to two inches in thickness. I have never been able to discover to my satisfaction why it has been found necessary to have such a thick wearing course, as of two inches. It is a well known fact that generally after a surface course has worn much over one-half to three-quarters of an inch that the remainder of the course disintegrates very rapidly. Would it therefore not be better to reduce the thickness of the surface

course to one inch, and increase the quality and thickness of the binder course by having a very dense mixture of sand and stone mixed with the proper percentage of asphalt cement, and of a thickness approximately two inches. A pavement of this type laid under my direction more than three years ago has given very good results, and especially in view of the fact that it was laid on a macadam foundation.



# SOCIETY AFFAIRS

JANUARY, 1913



## NOTICES

The rooms of the Society, on the tenth floor of the Bowling Green Building (11 Broadway), New York City, are open from 9 a. m. until 5 p. m., every day of the week, except Sundays and holidays. On Saturdays they are closed at 2 p. m.

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The Bowling Green Building is adjacent to the Bowling Green station of the subway, and is within easy reach of the Battery Park station of the 6th and 9th Avenue elevated lines. All Broadway surface cars also pass its doors.

\* \* \* \* \*

The privileges of the library and reading-room are extended to the members of other technical societies, and those who desire to attend any of the regular meetings of the Society will also be heartily welcomed.

\* \* \* \* \*

All members are urged to use the rooms of the Society, and to attend the meetings. Members can have their mail sent in care of the Society. We now have on file in the reading room about sixty of the technical and trade journals.

\* \* \* \* \*

The regular monthly meetings of the Society are held at 8 p. m. on the second Thursday of each month, with the exception of July and August. These meetings are held in room No. 3 on the 5th floor of the United Engineering Building, 25-29 West 39th Street, New York City, unless other arrangements are desirable, in which case members are duly notified.

\* \* \* \* \*

Members advertising for bids on construction work can file plans and specifications at the Society rooms, for the convenience of intending bidders in New York and vicinity. Announcement of such bids will be posted on the Bulletin board and printed in the Journal. The Society will also be glad to receive plans and specifications from non-members.

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In order to secure the prompt delivery of the Journal of the Society, members are requested to notify the Secretary at once of any change in their mailing address, otherwise the Society will not be responsible for the delivery of publications.



# FOURTH ANNUAL MEETING OF THE AMERICAN SOCIETY OF ENGINEER- ING CONTRACTORS

The Fourth Annual Meeting of the American Society of Engineering Contractors was held in the United Engineering Building, 29 West 39th Street, New York City, on Tuesday, January 14th.

## BUSINESS SESSION.

The morning session was devoted to business. The Annual Reports of the Secretary and the Treasurer were read. The result of the annual election of Officers and Directors was also announced, which was as follows:

*President,*

Howard J. Cole, Montclair, N. J.

*First Vice-President,*

Edward Wegmann, New York City.

*Second Vice-President,*

George T. Clark, Saskatoon, Sask., Can.

*Directors,*

Arthur S. Bent, Los Angeles, Calif.

DeWitt V. Moore, Indianapolis, Ind.

Leon F. Peck, Greenwich, Conn.

Many plans were discussed to make the Society of more direct benefit to its members, and a number of very valuable suggestions were offered for the consideration of the Board of Directors.

## AFTERNOON SESSION.

Mr. William L. Bowman, Civil Engineer and Attorney-at-Law, New York City, read a paper entitled "The New York State Law with Regard to Public Contracts, and Legal Questions Involved in the Proposed Amendment to the General Municipal

Law of New York." Mr. Bowman's paper was a discussion from the legal standpoint of the proposed Act which is now being drafted by the Committee on Legislation of this Society, and was of peculiar interest to the members of the Society and the community at large. Its reading was followed by an enthusiastic discussion.

Announcement was made to the effect that ten progress or preliminary reports had been received from as many of the Technical Standards Committees. The committees reporting were as follows: General Committee on Contracts, General Committee on Standard Specifications for Construction Work, General Committee on Arbitration, Sub-Committee A-1 on Public Construction Contracts, Sub-Committee A-2 on Private Construction Contracts, Sub-Committee C-10 on Railway Maintenance, Sub-Committee C-16 on Hydro-Electric Construction, Sub-Committee C-19 on Sewerage, Sub-Committee D-1 on Cost Analysis and Sub-Committee D-2 on Cost Accounting.

The committee work was only recently organized, and consequently the majority of the committees were not in a position to make any report at the Annual Meeting.

#### EVENING SESSION.

The Evening Session was held at 8 P. M. and was opened by an address by the incoming President, Mr. Howard J. Cole, of Montclair, N. J.

Mr. Edward F. Croker, Ex-Chief of the New York Fire Department and President of the Croker National Fire Prevention Engineering Company of New York City, then delivered a lecture on "Fire, Its Effects and Its Prevention," which was both interesting and instructive. This lecture was illustrated by about sixty lantern slides, showing some of the prominent fires in New York in recent years, and bringing out in detail the effects of fire upon steel and concrete and upon the so-called fireproof buildings.

The session was concluded by an informal smoker and collation.

It is intended to publish the proceedings of the Annual Meeting in the next issue of the Journal.

# TECHNICAL STANDARDS COMMITTEES

## GENERAL ADVISORY COMMITTEE

Chairman, Howard J. Cole, 161 Claremont Ave., Montclair, N. J.  
William B. Bamford, 614 Tenth Ave., Belmar, N. J.  
Julius R. Wemlinger, 11 Broadway, New York City.

### A. COMMITTEE ON CONTRACTS

Chairman, William B. Bamford, 614 10th Ave., Belmar, N. J.

#### **A-1. Public Construction Contracts.**

Chr., Wm. B. King, 728 17th St., Washington, D. C.

#### **A-2. Private Construction Contracts.**

Chr., Wm. B. Bamford, 614 10th Ave., Belmar, N. J.

#### **A-3. Contracts between Contractor and Sub-Contractor.** (Not organized.)

#### **A-4. Contracts between Contractor and Manufacturer.**

Chr., Wm. L. Bowman, 60 Wall St., New York City.

#### **A-5. Contracts between Owner and Engineer.**

Chr., Jerome Cochran, 240 Howard St., Detroit, Mich.

#### **A-6. Co-Partnership Agreements.**

Chr., Wm. L. Bowman, 60 Wall St., New York City.

### B. COMMITTEE ON STANDARD SPECIFICATIONS FOR MATERIALS

Chairman, T. Rhys Smith, C.E., Cos Cob, Conn.

#### **B-1. Steel.**

Chr., A. L. Johnson, Mutual Life Bldg., Buffalo, N. Y.  
Elie Cannes, 30 Church St., New York City.  
J. R. Wemlinger, 11 Broadway, New York City.

#### **B-2. Cast Iron.**

Chr., O. B. Stauffer, Herzog Iron Wks., St. Paul, Minn.

#### **B-3. Wrought Iron.**

(Not organized.)

#### **B-4. Minor Metals and their Alloys.**

(Not organized.)

**B-5. Lime and Cement.**

Chr., C. W. Boynton, 72 W. Adams St., Chicago, Ill.  
E. S. Hanson, 1207 Morton Bldg., Chicago, Ill.  
W. R. Harris, P. O. Box 155, Regina, Sask., Can.  
Coleman Meriwether, 165 Broadway, New York City.  
R. T. Miller, 1330 The Monadnock, Chicago, Ill.

**B-6. Concrete Aggregate.**

(Not organized.)

**B-7. Stone.**

W. W. Mack, 1 Madison Ave., New York City.

**B-8. Wood.**

(Not organized.)

**B-9. Clay and Terra Cotta.**

(Not organized.)

**B-10. Paving Materials.**

Chr., Geo. C. Warren, 59 Temple Place, Boston, Mass.

**C. COMMITTEE ON STANDARD SPECIFICATIONS  
FOR CONSTRUCTION WORK**

Chairman, DeWitt V. Moore, Indiana Pythian Bldg.,  
Indianapolis, Ind.

**C-1. Work Preliminary to Construction.**

(Not organized.)

**C-2. Excavation.**

Chr., C. L. Parmelee, 30 Church St., New York City.

**C-3. Foundations.**

(Not organized.)

**C-4. Waterproofing.**

Chr., Myron H. Lewis, Municipal Bldg., Long Island City, N. Y.  
C. F. Dingman, 1 Broadway, New York City.  
Charles Freund, 11 Broadway, New York City.  
W. P. Taylor, Great Neck Sta., L. I., N. Y.

**C-5. Fireproofing.**

Chr., Arthur Hardoncourt, Jr., P. O. Box 71, Station L, Brooklyn, N. Y.

**C-6. Roofing.**

(Not organized.)

## **C-7. Highway Construction.**

Chr., F. B. Bosch, Commonwealth Trust Bldg., Harrisburg, Pa.  
Howard Egleston, Hibernia Bank Bldg., New Orleans, La.  
C. F. Gillis, P. O. Box 1576, Saskatoon, Sask., Can.  
E. M. Seitz, Goff Bldg., Camden, N. J.  
W. B. Spencer, 2 Rector St., New York City.  
Howell Topping, 75 Carroll St., Binghamton, N. Y.  
G. C. Warren, 59 Temple Pl., Boston, Mass.

## **C-8. Highway Maintenance.**

Chr., Carl Weber, 95 Nassau St., New York City.  
F. B. Earl, 17 Battery Pl., New York City.  
L. F. Peck, Town Hall, Greenwich, Conn.  
G. C. Scales, County Engineer, Marion, Ala.  
C. B. Scott, P. O. Box 181, Lynchburg, Va.  
G. C. Warren, 59 Temple Pl., Boston, Mass.

## **C-9. Railway Construction.**

Chr., V. M. Roberts, Goderich, Ont., Canada.

## **C-10. Railway Maintenance.**

Chr., E. T. Howson, Transportation Bldg., Chicago, Ill.

## **C-11. Bridges.**

Chr., Daniel B. Luten, Traction Terminal Bldg., Indianapolis, Ind.

## **C-12. Buildings.**

(Not organized.)

## **C-13. Dams.**

Chr., Edward Wegmann, Park Row Bldg., New York City.

## **C-14. Harbor Improvements.**

Chr., Henry F. Alexander, P. O. Box 312, Lorain, Ohio.  
A. R. Crookshank, P. O. Box 336, St. John, N. B., Can.  
H. A. Paquette, P. O. Box 93, Lewis, Que., Can.  
J. K. Scammell, P. O. Box 321, St. John, N. B., Can.  
C. McN. Steeves, P. O. Box 336, St. John, N. B., Can.  
S. W. Stewart, 40 Central St., Boston, Mass.  
A. G. Tapley, Custom House, St. John, N. B., Can.  
J. H. Tromanhauser, 604 Temple Bldg., Toronto, Ont., Can.

## **C-15. Dredging and Hydraulic Work.**

Chr., H. C. Lyons, 15 William St., New York City.

## **C-16. Hydro-Electric Construction.**

Chr., E. H. Abadie, Third Nat'l Bank Bldg., St. Louis, Mo.

## **C-17. Drainage and Irrigation.**

Chr., J. B. Balcomb, 100 Washington St., Chicago, Ill.

## **C-18. Waterworks.**

Chr., Raymond W. Parlin, Lock Box 1103, Pittsburgh, Pa.

## **C-19. Sewerage.**

Chr., Geo. L. Watson, 3249 North 15th St., Philadelphia, Pa.  
G. M. Eady, 610 Inter-Southern Bldg., Louisville, Ky.  
J. J. Fusco, 671 Broad St., Newark, N. J.  
H. C. Gass, Contractor, Waco, Tex.  
Edward Horstmann, Jr., Kearny, N. J.  
J. M. Mackay, Trunk Sewer Dept., Regina, Sask., Can.  
R. L. Russell, 186 Remsen St., Brooklyn, N. Y.  
F. A. Snyder, 17 West 42nd St., New York City.  
J. M. Solomon, Jr., 30 No. Seventh St., Philadelphia, Pa.  
W. W. Young, 220 Broadway, New York City.

## **C-20. Tunnels.**

Chr., B. M. Laughead, McDonald, Washington Co., Pa.  
Ernest Wanamaker, 105 S. La Salle St., Chicago, Ill.

## **C-21. Concrete Construction.**

(Not organized.)

## **C-22. Reinforced Concrete Construction.**

(Not organized.)

## **C-23. Masonry Construction.**

(Not organized.)

## **C-24. Steel Construction.**

(Not organized.)

## **C-25. Timber Construction.**

(Not organized.)

## **D. COMMITTEE ON COST DATA**

Chairman, Halbert P. Gillette, 608 South Dearborn St.,  
Chicago, Ill.

### **D-1. Cost Analysis.**

Chr., DeWitt V. Moore, Pythian Bldg., Indianapolis, Ind.  
C. C. Brown, Commercial Club Bldg., Indianapolis, Ind.  
A. F. Byers, 65 Victoria St., Montreal, Que., Can.  
William O'Malley, Prado 93A, Havana, Cuba.  
S. E. Thompson, Odd Fellows Bldg., Newton Highlands, Mass.

### **D-2. Cost Accounting.**

Chr., Howard J. Cole, 161 Claremont Ave., Montclair, N. J.  
R. T. Dana, 15 William St., New York City.  
C. E. Jacoby, 515 Shukert Bldg., Kansas City, Mo.  
H. P. Seiderman, U. S. R. S., Washington, D. C.  
Wilmer Waldo, Union National Bank Bldg., Houston, Tex

## **E. COMMITTEE ON SCIENTIFIC MANAGEMENT**

Chairman, Richard T. Dana, 15 William St., New York City.

(Sub-Committees Not Organized.)

## **F. COMMITTEE ON LEGISLATION**

Chairman, Cassius E. Gillette, Land Title Bldg., Philadelphia, Pa.

### **F-1. Public Construction Contracts Law.**

Chr., C. E. Gillette, Land Title Bldg., Philadelphia, Pa.

### **F-2. Private Construction Contracts Law.**

Chr., Wm. B. Bamford, 614 Tenth Ave., Belmar, N. J.

### **F-3. Legislation Affecting Labor.**

Chr., W. R. Harris, P. O. Box 155, Regina, Sask., Canada.

### **F-4. Legislation Affecting the Contractor.**

(Not organized.)

### **F-5. Legislation Affecting the Engineer.**

Chr., Wm. L. Bowman, 60 Wall St., New York City.

### **F-6. General Legislation.**

Chr., Wm. B. King, 728 17th St., Washington, D. C.

## **G. COMMITTEE ON ARBITRATION**

Chr., Eugene H. Abadie, Third National Bank Bldg., St. Louis, Mo.

(Sub-Committee not organized.)

## **H. COMMITTEE ON PLANT AND EQUIPMENT**

(Not organized.)

## **I. COMMITTEE ON LABOR**

(Not organized.)

## **J. COMMITTEE ON DESIGNING AND PLANNING**

(Not organized.)

# GENERAL NOTES

## LIFE MEMBERSHIP

At the recent Annual Meeting of the Society, Article V of the Constitution was amended by adding the following as Section 6:

"All future annual dues may be compounded by a single payment of \$150. Provided, that the first twenty-five members compounding their dues shall pay only \$100.

"Provided, that any person desiring to compound for future dues shall have paid his entrance fee, all arrears of dues, and the annual dues for the current year, before the compounding sum may be available.

"Members compounding shall sign an agreement that they will be governed by the Constitution and Laws of the Society as they now are formed, or as they may be hereafter altered, amended, or enlarged, and that in case of their ceasing to be connected with the Society from any cause whatever, the amount theretofore paid by them for compounding, and for entrance fees and annual dues, shall be the property of the Society.

"All moneys thus paid in commutation of annual dues shall be invested as a permanent fund, only the interest thereupon being subject to appropriation for current expenses.

"Provided, that the commutation of dues of the first twenty-five members need not be invested in a permanent fund until such time as the Board of Directors shall so order, but it may be set aside and used by the Board, at its discretion, as a reserve fund for the payment of current obligations."

It is a pleasure to observe that the above Amendment has been received most favorably by the members of the Society. Four members have already taken out life memberships, and as many more have signified their intention of doing likewise during the spring or summer.

The present Life Members, named in the order of their application, are as follows:

Carl Weber, Engineer and Contractor, 2415 E Street, Sacramento, Cal.

Edward Wegmann, Consulting Engineer, Department of Water Supply, Gas & Electricity, New York City.

DeWitt V. Moore, Contractor, 1616 Merchants Bank Building, Indianapolis, Ind.

Julius R. Wemlinger, President, Wemlinger Steel Piling Co., 11 Broadway, New York City.

Any member of the Society who is in good standing is eligible for life membership, and may take out same, as above specified, upon the payment of \$100. Members taking out life memberships prior to June 30th will have deducted from the cost of same the amount of their dues for the current year.

## ANNOUNCEMENT OF MEETINGS

A very attractive and interesting schedule has been arranged for the meetings of the Society during the present season, and it is hoped that all members within reach of New York City will endeavor to attend on one or more of these occasions.

A portion of the schedule is as follows:

Meeting, February 13th—"Modern Bituminous Pavements," by William B. Spencer of New York City.

Meeting, March 13th—"Human Nature on Construction Work," by C. H. Hollingsworth of Buffalo, N. Y.

Meeting, April 10th—"Survey and Construction of Steam Railway Tunnels," by B. M. Laughead of McDonald, Pa.

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## OFFICERS OF ST. LOUIS BRANCH

The following officers were elected for the current year at the Annual Meeting of the St. Louis Branch of the Society, held in St. Louis on January 14th.

Chairman, W. J. Knight. Vice-Chairman, James Adkins, Jr.

Treasurer, E. F. Carter.

Councilor (3 years), H. M. Cryder. Member Joint Council, A. A. Aegerter.

The Proceedings of the Annual Meeting of the St. Louis Branch will be published in the February issue of the Journal.

\* \* \* \* \*

## HONOR ROLL

Name	Members Secured
C. F. Gillis, Saskatoon, Sask., Canada	2
A. P. Greensfelder, St. Louis, Mo.	2
W. R. Harris, Regina, Sask., Canada	2
A. Hardoncourt, Jr., Brooklyn, N. Y.	1
D. E. Henry, Manila, P. I.	1
W. B. King, Washington, D. C.	1
E. P. Robb, New Iberia, La.	1
Edward Wegmann, New York City	1
J. R. Wemlinger, New York City	1
9 Members	12

## INDEX TO VOLUME IV

The index to Volume IV of the JOURNAL is published in the back of this issue, together with title pages. The Index is divided into two parts, for convenience in binding. In preparing the JOURNAL for binding, it is intended that the "Society Affairs," published in the front of each issue, shall be consolidated and that they shall comprise Part II of the bound volume. Part I and Part II are paged separately, so that a sequential rearrangement can be accomplished in a very few minutes.

Members who wish to have this, or any other, volume of the JOURNAL, bound in standard style by the Society, must forward the Secretary a complete file of the JOURNAL for that purpose. Missing copies will be supplied by the Society at the rate of ten cents each. Two styles of binding have been officially adopted—half-leather, with black cloth sides, red morocco corners and back, and gilt lettering, \$2.00; and cloth, buckram with gilt lettering, \$1.50. Checks must be sent in with all orders.

\* \* \* \* \*

## PAYMENT OF DUES

We want every member of the Society to realize the importance of paying his dues for 1913 promptly. During 1912 the Society was greatly hampered by the delinquency of certain members, and it was even necessary, on several occasions, to delay publication of the JOURNAL pending the collection of outstanding dues. The revenue of the Society is sufficient to meet all actual expenses, and such a condition as the above may be avoided during 1913, if each member will remit promptly. Every member who delays payment of his dues, even for a few months, hampers the Society to some extent.

The following provisions of the Constitution, relative to payment of dues, will be rigidly enforced during 1913. Extract, Art. V, Sec 6.

6. Any person whose dues are more than three (3) months in arrears shall be notified by the Secretary. Should his dues not be paid when they become six (6) months in arrears, he shall lose the right to vote or to receive the publication of the Society. Should his dues become nine (9) months in arrears, he shall again be notified in form prescribed by the Board of Directors; and if such dues become one (1) year in arrears, he shall forfeit his connection with the Society. The Board of Directors, however, may, for cause deemed by it sufficient, extend the time for payment and for the application of these penalties.

# EMPLOYMENT

Actuated by a desire to be of direct assistance to all of its members in securing better positions, the Society earnestly solicits applications both for positions and for men available. This department is under the personal supervision of the Secretary, and all applications are carefully numbered and placed on file at the headquarters of the Society. The list of men available is made up wholly of members of the Society, and as such is entirely dependable. The Secretary will be glad to furnish full information upon request.

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## MEN AVAILABLE

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008. Member of the Society, with twenty-three years' experience on public work, wishes to secure a position as Superintendent. Is forty-two years old, and married. For the past nine years has been in charge of work such as dams, reservoirs, locks, seawalls, canals, drydocks, breakwaters, bridge erection and foundations, and railroad construction. Is open for immediate engagement, and is willing to go anywhere in the United States. Write to the Secretary for further information.

\* \* \* \* \*

009. A member of the Society, 32 years old and married, desires to secure employment with a firm of contractors doing reinforced concrete work, either exclusively or as a side line, and is willing to accept a position at a minimum salary of \$175 per month. He is a graduate of the Zurich Polytechnic Institute (Switzerland), and has had large experience as draftsman, designer, estimator, and superintendent. He has had three years architectural and railroad experience, and two years general building and special reinforced concrete experience in Switzerland and Germany. Since 1905 he has been in the United States, and during that time he has done service as draftsman, estimator, solicitor, superintendent and contractor on reinforced concrete construction, fireproofing and general contracting work. He has been in the employ of well known firms throughout the country, and is in a position to refer to them all questions as to his ability and experience. The Secretary will be pleased to hear from any member of the Society who is in a position to use a man of this calibre.

010. Member of the Society, technical education, with seven years' practical experience, desires position with engineer or architect as building or concrete inspector. Is 25 years old and married. Has good executive ability and is thoroughly proficient in the theory and practice of structural design and construction, heating, ventilation, electric wiring, etc. Experience covers location and construction on railroad work; design, supervision and construction of reinforced concrete and steel structures, bridge work, sewers, paving, cost analysis, surveys, examinations and reports. Is familiar with the various methods of reinforcement. Tropical experience, speaks and writes Spanish, no objection to location in Mexico or South America. At present in contracting business for himself, however, is financially unable to meet competition. Salary to be commensurate with services rendered or required. Can report on reasonable notice. Will consider opening with construction company offering opportunity for advancement. Own drawing and surveying outfit.

\* \* \* \* \*

011. Member of the Society, specialist in concrete construction, is open for engagement with large contracting concern, as General Manager or Estimator and Chief Engineer, at initial salary of \$200 per month. Graduated in Civil Engineering at the University of Christiania, Norway, and had two years special course in the University of Berlin. Was for five years City Engineer in Norway. Has had ten years experience in this country, as Consulting Engineer in private practice and as Chief Engineer of large contracting concerns engaged in concrete construction, etc. Is at present employed in latter capacity. Can furnish best of references. Write Secretary for particulars.

\* \* \* \* \*

012. Member of the Society, thirty-eight years old, who has had fifteen years practical experience in hydro-electric construction, power plant design, reinforced concrete construction, structural steel work, surveys, etc., is open for engagement. Has business ability and tact. Is at present employed, and can furnish best of references. Write Secretary for further information.

013. Civil Engineer, member of the Society, at present located in India, will be available in March or April. Excellent executive ability. Long experience in foreign countries. Speaks Spanish and French. Expert in reinforced concrete design and construction. Desires to locate in United States or West Indies, but engagement in any country will be considered. Will accept commissions to make investigations and reports on any works or subject of an engineering nature in any country. Considerable experience as foreign representative. Full particulars may be had by addressing the Secretary of the Society.

\* \* \* \*

014. Contractors and Engineers often have rush jobs on bids, designs and other work, making it convenient, and sometimes necessary, to have an extra man or men for a short period. An engineer of ten years' experience, a member of the Society, residing in New York, desires odd work of this nature,—methods of doing work, estimates, computations and designs. Will also furnish additional men when desired. Write or telephone the Secretary.

\* \* \* \* \*

015. Civil and survey engineer, member of the Society, 30 years old and married, wishes to locate in New England or the North Atlantic States on highway, concrete or hydro-electric construction, or with engineer or contractor where part of time would be spent on making surveys and investigations, and the remainder of time making plans, estimating, designing, etc. Has had experience as instrument man and computer on highway, drainage, land and topographical surveys; as assistant locating engineer on railroad surveys and estimates; as engineer and superintendent of construction on highway and bridge work; as draughtsman, transit-man and chief of party on water power development surveys and intra-coastal surveys under the War Department. Is at present employed in the resident engineer's office of an important Eastern railroad. Can supply own drawing instruments, transit, tapes, etc., and will consider minimum salary of \$125.00 per month. Address the Secretary for full information and references.

## THE QUESTION BUREAU

Members of the society in good standing are entitled to counsel and advice from the "Question Bureau," in reply to questions framed and submitted in accordance with the following provisions and conditions.

The service of this bureau is advisory counsel. The bureau will give counsel, advice, suggestions, and criticisms in reply to definite and specific questions regarding methods, engineering and contracting materials or technical and legal advice or business policy.

The service of the bureau does not include creative or initiative work. It is outside the scope to originate new business policies, devise new systems, draft new forms and records, recommend appliances of any particular name, give complicated legal, engineering, or technical opinions.

The replies to inquiries will be the best advice the experts of the society can offer; but the responsibility of applying this counsel rests wholly with the individual or firm to whom this information is sent, and not to any extent nor in any sense with the bureau.

\* \* \* \* \*

The following question and answer is taken from the February issue of *Engineering Law* and is reproduced here as an example of the class of information which we propose to furnish members of the Society. Questions, however, are not restricted to those of a legal nature.

*Bids were asked by a city official on some work consisting of a number of items. Bids were submitted by A, B and C. B stated in his bid that he would do the work for a certain sum if he received all of it. B's bid was the lowest, but the contract was given to A. There is a statute to the effect that contracts shall be let to the lowest bidder. Will B recover in an action against the city?*

*F. W. W.,  
Indianapolis, Ind.*

*Dec. 15, 1912.*

B's bid was conditional in that he said he would do the work if he got all of it. It lacks mutuality, and could not be binding on the parties if it had been accepted. The statute undoubtedly vests some discretion in the city officials as to the responsibility of bidders.

# APPLICATIONS ACCEPTED

## MEMBERS

FRANK O. BLAKE, President, El Oso Asphalt Co., California  
Bldg., Los Angeles, Cal.

LOUIS S. COLLIER, Resident Engineer, United Fruit Co., Ceiba  
Division, Honduras. *Address*, 4025 D'Hemecourt St., New  
Orleans, La.

WALTER G. GAMBLE, General Contractor and Engineer, 37  
Portland Place, St. Louis, Mo.

R. E. W. HAGARTY, Estimating Engineer, Trussed Concrete  
Steel Co. of Canada, Walkersville, Ont. *Address*, P. O.  
Box 426, Regina, Sask., Canada.

WILLIAM G. KENNEDY, Manufacturer of Fire Proof Ma-  
terials, 186 Prospect Place, Brooklyn, N. Y.

HORACE F. POMEROY, Manager, *Engineering News*, 505  
Pearl St., New York City. *Address*, Forest Hill, L. I., N. Y.

PRESTON A. RICHARDSON, Superintendent of Construction,  
Fruin-Colnon Const. Co., Merchant Laclede Bldg., St. Louis,  
Mo. *Address*, 2237 Red Bud Ave., St. Louis, Mo.

RODGER P. STRICKLAND, President, Saskatchewan Supply  
Co., Ltd., Saskatoon, Sask., Canada.

## TRANSFERRED

**(Junior Member to Member)**

EDMUND A. PRATT, Engineer, Trussed Concrete Steel Co.,  
Detroit, Mich. *Address*, Taj Mahal Hotel, Bombay, India.

## PERSONALS

Mr. K. C. Bowers, member of the Society, recently accepted position as General Manager for the O. S. Brown Construction Company, General Contractors and Engineers, of Prosser, Wash.

\* \* \* \* \*

Mr. K. R. Schuster, member of the Society, who has been engaged in construction work in San Isidro, Dominican Republic, for the past six months, has returned to his old address, 113 Bainbridge St., Brooklyn, N. Y.

\* \* \* \* \*

Mr. W. C. Sample, member of the Society, who was for some time located in New York and Brooklyn, has begun a Consulting Engineering practice in Fort William, Ont. His office address is 106 Cuthbertson Bldg., Fort Williams, Ont., Canada.

\* \* \* \* \*

Mr. A. E. Rudd, junior member of the Society, who was formerly with the General Construction Co., of Guelph, Ont., has formed a business partnership with Mr. L. Malcolm, under the firm name of Malcolm & Rudd, Consulting Engineers, Engineering Contractors and Surveyors, with headquarters in the Metropolitan Bank Bldg., Guelph, Ont., Canada.

\* \* \* \* \*

The following announcement has been received from Mr. George M. Eady, member of the Society: George M. Eady, general contractor, announces that he has moved his offices to 610 Inter-Southern Building, Louisville, Ky., February 1, 1913. Telephone Main 2164-A.

## CHANGES IN ADDRESS

BALCH, R. L.....	530 State St., Madison, Wis.
BALCOMB, J. B.....	Alberson, Ore.
BERNSTEIN, M.....	4340 Germantown Ave., Philadelphia, Pa.
BOWERS, K. C.....	c/o O. S. Brown Const. Co., Prosser, Wash.
BRILLHART, J. H.....	4419 Live Oak St., Dallas, Tex.
BRISTOL, R. M.....	2642 Russell St., St. Louis, Mo.
BYERS, A. F.....	745 Belmont Ave., Westmount, Que., Canada.
CARPENTER, L. G.....	First National Bank Bldg., Denver, Colo.
CLEMENT, H.....	Radisson, Sask., Canada
COATES, J. B. S.....	410 H. W. Hellman Bldg., Los Angeles, Cal.
COLEMAN, J. B.....	5332 Indiana Ave., Chicago, Ill.
CROOKSHANK, A. R.....	P. O. Box 28, St. John, N. B., Canada
DEWAR, R. C.....	106 N. Maple Ave., East Orange, N. J.
EVANS, W. J.....	103 Bay St., Toronto, Ont., Canada.
HOLLINGSWORTH, C. H.....	118 Fargo Ave., Buffalo, N. Y.
LAPLEAU, L. V.....	Jeanerette, La.
LOCKWOOD, W. D.,	

23 Walnut Ave., Rockville Centre, L. I., N. Y.

MOORE, D. V.....	1616 Merchants' Bank Bldg., Indianapolis, Ind.
MOORE, J. G.....	c/o Trumbo Dredging Co., Miami, Fla.
PAGET, R. E.....	New Hazelton, B. C., Canada
QUIMBY, C. H.....	427 62nd St., Oakland, Cal.
ROBERTS, E. B.....	519 Park Ave., Auburn, R. I.
ROSE, F. N.....	528 S. E. Kingshighway, St. Louis, Mo.
RUDD, A. E.....	Metropolitan Bank Bldg., Guelph, Ont., Canada.
SCALES, G. C.....	Marion, Ala.
SCHUSTER, K. R.....	113 Bainbridge St., Brooklyn, N. Y.
SWEENEY, C. F.....	Phillipsburg, Pa.
VILAS, W. A.....	900 Michigan Ave., Chicago, Ill.
WEBER, C.....	2415 E St., Sacramento, Cal.
WULFF, L. B.....	440 Woodbine Ave., Kirkwood, Mo.

# READING ROOM

(Open '9 A. M. to 5 P. M.)

## ENGINEERING

- \*Canadian Engineer
- Cassier's Magazine
- Chemical Engineer
- Domestic Engineer
- Engineering
- Engineering Law
- Engineering News
- Engineering Record
- Municipal Engineering
- Municipal Journal
- †The Engineer
- The Engineering Magazine
- The Excavating Engineer
- The Irrigation Age
- Western Engineering
- CONTRACTING
- \*Contract Record & Engineering Review
- Engineering & Contracting
- Southwest Contractor & Manufacturer
- The American Contractor
- The Contractor

## RAILWAYS

- Electric Railway Journal
- Railway Age Gazette
- Railway & Locomotive Engineering
- Railway Engineering & Maintenance of Way
- Street Railway Bulletin
- The Railway & Engineering Review

## MINING

- Mines and Minerals
- Mining World
- Mining Science
- Mining and Scientific Press
- \*The Canadian Mining Journal

## UNIVERSITY AND SOCIETY JOURNALS

- Quarterly Bulletin, Bureau of Public Works, Manila, P. I.
- Journal of the American Society of Mechanical Engineers
- Journal of the Cleveland Engineering Society
- Proceedings of the Engineers' Club of Philadelphia
- Proceedings of Indiana Engineering Society
- Professional Memoirs, Corps of Engineers, U. S. Army
- \*Manitoba Engineer (University of Manitoba)
- Applied Science (Toronto University)
- Cornell Civil Engineer
- Yale Scientific Monthly

†British

\*Canadian

# SOCIETY AFFAIRS

FEBRUARY, 1913



## NOTICES

The rooms of the Society, on the tenth floor of the Bowling Green Building (11 Broadway), New York City, are open from 9 a. m. until 5 p. m., every day of the week, except Sundays and holidays. On Saturdays they are closed at 2 p. m.

\* \* \* \* \*

The Bowling Green Building is adjacent to the Bowling Green station of the subway, and is within easy reach of the Battery Park station of the 6th and 9th Avenue elevated lines. All Broadway surface cars also pass its doors.

\* \* \* \* \*

The privileges of the library and reading-room are extended to the members of other technical societies, and those who desire to attend any of the regular meetings of the Society will also be heartily welcomed.

\* \* \* \* \*

All members are urged to use the rooms of the Society, and to attend the meetings. Members can have their mail sent in care of the Society. We now have on file in the reading room about sixty of the technical and trade journals.

\* \* \* \* \*

The regular monthly meetings of the Society are held at 8 p. m. on the second Thursday of each month, with the exception of July and August. These meetings are held in room No. 3 on the 5th floor of the United Engineering Building, 25-29 West 39th Street, New York City, unless other arrangements are desirable, in which case members are duly notified.

\* \* \* \* \*

Members advertising for bids on construction work can file plans and specifications at the Society rooms, for the convenience of intending bidders in New York and vicinity. Announcement of such bids will be posted on the Bulletin board and printed in the Journal. The Society will also be glad to receive plans and specifications from non-members.

\* \* \* \* \*

In order to secure the prompt delivery of the Journal of the Society, members are requested to notify the Secretary at once of any change in their mailing address, otherwise the Society will not be responsible for the delivery of publications.

# TECHNICAL STANDARDS COMMITTEES

## GENERAL ADVISORY COMMITTEE

Chairman, Howard J. Cole, 550 Main St., Hartford, Conn.  
William B. Bamford, 614 Tenth Ave., Belmar, N. J.  
Julius R. Wemlinger, 11 Broadway, New York City.

### A. COMMITTEE ON CONTRACTS

Chairman, William B. Bamford, 614 10th Ave., Belmar, N. J.

#### **A-1. Public Construction Contracts.**

Chr., Wm. B. King, 728 17th St., Washington, D. C.

#### **A-2. Private Construction Contracts.**

Chr., Wm. B. Bamford, 614 10th Ave., Belmar, N. J.

#### **A-3. Contracts between Contractor and Sub-Contractor.** (Not organized.)

#### **A-4. Contracts between Contractor and Manufacturer.**

Chr., Wm. L. Bowman, 60 Wall St., New York City.

#### **A-5. Contracts between Owner and Engineer.**

Chr., Jerome Cochran, 240 Howard St., Detroit, Mich.

#### **A-6. Co-Partnership Agreements.**

Chr., Wm. L. Bowman, 60 Wall St., New York City.

### B. COMMITTEE ON STANDARD SPECIFICATIONS FOR MATERIALS

Chairman, T. Rhys Smith, C.E., Cos Cob, Conn.

#### **B-1. Steel.**

Chr., A. L. Johnson, Mutual Life Bldg., Buffalo, N. Y.  
Elie Cannes, 30 Church St., New York City.  
J. R. Wemlinger, 11 Broadway, New York City.

#### **B-2. Cast Iron.**

Chr., O. B. Stauffer, Herzog Iron Wks., St. Paul, Minn.

#### **B-3. Wrought Iron.**

(Not organized.)

#### **B-4. Minor Metals and their Alloys.**

(Not organized.)

### **B-5. Lime and Cement.**

Chr., C. W. Boynton, 72 W. Adams St., Chicago, Ill.  
T. H. Ahlbom, Waterloo, Iowa.  
A. S. Bent, Central Bldg., Los Angeles, Cal.  
E. S. Hanson, 1207 Morton Bldg., Chicago, Ill.  
W. R. Harris, P. O. Box 155, Regina, Sask., Can.  
Coleman Meriwether, 165 Broadway, New York City.  
R. T. Miller, 1330 The Monadnock, Chicago, Ill.

### **B-6. Concrete Aggregate.**

(Not organized.)

### **B-7. Stone.**

W. W. Mack, 1 Madison Ave., New York City.

### **B-8. Wood.**

(Not organized.)

### **B-9. Clay and Terra Cotta.**

(Not organized.)

### **B-10. Paving Materials.**

Chr., Geo. C. Warren, 59 Temple Place, Boston, Mass.

## **C. COMMITTEE ON STANDARD SPECIFICATIONS FOR CONSTRUCTION WORK**

Chairman, DeWitt V. Moore, Merchants Bank Bldg.,  
Indianapolis, Ind.

### **C-1. Work Preliminary to Construction.**

(Not organized.)

### **C-2. Excavation.**

Chr., C. L. Parmelee, 30 Church St., New York City.

### **C-3. Foundations.**

(Not organized.)

### **C-4. Waterproofing.**

Chr., Myron H. Lewis, Municipal Bldg., Long Island City, N. Y.  
C. F. Dingman, 1 Broadway, New York City.  
Charles Freund, 11 Broadway, New York City.  
W. P. Taylor, Great Neck Sta., L. I., N. Y.

### **C-5. Fireproofing.**

Chr., Arthur Hardoncourt, Jr., P. O. Box 71, Station L, Brooklyn, N. Y.

### **C-6. Roofing.**

(Not organized.)

## **C-7. Highway Construction.**

Chr., F. B. Bosch, Commonwealth Trust Bldg., Harrisburg, Pa.  
Howard Egleston, Hibernia Bank Bldg., New Orleans, La.  
C. F. Gillis, P. O. Box 1576, Saskatoon, Sask., Can.  
E. M. Seitz, Goff Bldg., Camden, N. J.  
W. B. Spencer, 2 Rector St., New York City.  
Howell Topping, 189 Willoughby Ave., Brooklyn, N. Y.,  
G. C. Warren, 59 Temple Pl., Boston, Mass.

## **C-8. Highway Maintenance.**

Chr., Carl Weber, 312 Forum Bldg., Sacramento, Cal.  
F. B. Earl, 17 Battery Pl., New York City.  
L. F. Peck, 432 Edgewood St., Hartford, Conn.  
G. C. Scales, County Engineer, Marion, Ala.  
C. B. Scott, P. O. Box 181, Lynchburg, Va.  
G. C. Warren, 59 Temple Pl., Boston, Mass.

## **C-9. Railway Construction.**

Chr., V. M. Roberts, Goderich, Ont., Canada.

## **C-10. Railway Maintenance.**

Chr., E. T. Howson, Transportation Bldg., Chicago, Ill.

## **C-11. Bridges.**

Chr., Daniel B. Luten, Traction Terminal Bldg., Indianapolis, Ind.

## **C-12. Buildings.**

(Not organized.)

## **C-13. Dams.**

Chr., Edward Wegmann, Park Row Bldg., New York City.

## **C-14. Harbor Improvements.**

Chr., Henry F. Alexander, P. O. Box 312, Lorain, Ohio.  
A. R. Crookshank, P. O. Box 336, St. John, N. B., Can.  
H. A. Paquette, P. O. Box 93, Lewis, Que., Can.  
J. K. Scammell, P. O. Box 321, St. John, N. B., Can.  
C. McN. Steeves, P. O. Box 336, St. John, N. B., Can.  
S. W. Stewart, 40 Central St., Boston, Mass.  
A. G. Tapley, Custom House, St. John, N. B., Can.  
J. H. Tromhauser, 604 Temple Bldg., Toronto, Ont., Can.

## **C-15. Dredging and Hydraulic Work.**

Chr., H. C. Lyons, 15 William St., New York City.

## **C-16. Hydro-Electric Construction.**

Chr., E. H. Abadie, Third Nat'l Bank Bldg., St. Louis, Mo.

## **C-17. Drainage and Irrigation.**

Chr., J. B. Balcomb, Alberson, Ore.

### **C-18. Waterworks.**

Chr., Raymond W. Parlin, Lock Box 1103, Pittsburgh, Pa.

### **C-19. Sewerage.**

Chr., Geo. L. Watson, 127 West 96th St., New York City.

G. M. Eady, 610 Inter-Southern Bldg., Louisville, Ky.

J. J. Fusco, 671 Broad St., Newark, N. J.

H. C. Gass, Contractor, Waco, Tex.

Edward Horstmann, Jr., Kearny, N. J.

J. M. Mackay, Trunk Sewer Dept., Regina, Sask., Can.

R. L. Russell, 37 Liberty St., New York City.

F. A. Snyder, 17 West 42nd St., New York City.

J. M. Solomon, Jr., 30 No. Seventh St., Philadelphia, Pa.

W. W. Young, 220 Broadway, New York City.

### **C-20. Tunnels.**

Chr., B. M. Laughead, McDonald, Washington Co., Pa.

Ernest Wanamaker, 105 S. La Salle St., Chicago, Ill.

### **C-21. Concrete Construction.**

(Not organized.)

### **C-22. Reinforced Concrete Construction.**

(Not organized.)

### **C-23. Masonry Construction.**

(Not organized.)

### **C-24. Steel Construction.**

(Not organized.)

### **C-25. Timber Construction.**

(Not organized.)

## **D. COMMITTEE ON COST DATA**

Chairman, Halbert P. Gillette, 608 South Dearborn St., Chicago, Ill.

### **D-1. Cost Analysis.**

Chr., DeWitt V. Moore, Merchants Bank Bldg., Indianapolis, Ind.

C. C. Brown, Commercial Club Bldg., Indianapolis, Ind.

A. F. Byers, 65 Victoria St., Montreal, Que., Can.

William O'Malley, Prado 93A, Havana, Cuba.

S. E. Thompson, Odd Fellows Bldg., Newton Highlands, Mass.

### **D-2. Cost Accounting.**

Chr., Howard J. Cole, 550 Main St., Hartford, Conn.

R. T. Dana, 15 William St., New York City.

C. E. Jacoby, 515 Shukert Bldg., Kansas City, Mo.

H. P. Seiderman, U. S. R. S., Washington, D. C.

Wilmer Waldo, Union National Bank Bldg., Houston, Tex

## **E. COMMITTEE ON SCIENTIFIC MANAGEMENT**

Chairman, Richard T. Dana, 15 William St., New York City.  
(Sub-Committees Not Organized.)

## **F. COMMITTEE ON LEGISLATION**

Chairman, Cassius E. Gillette, Land Title Bldg., Philadelphia, Pa.

### **F-1. Public Construction Contracts Law.**

Chr., C. E. Gillette, Land Title Bldg., Philadelphia, Pa.

### **F-2. Private Construction Contracts Law.**

Chr., Wm. B. Bamford, 614 Tenth Ave., Belmar, N. J.

### **F-3. Legislation Affecting Labor.**

Chr., W. R. Harris, P. O. Box 155, Regina, Sask., Canada.

### **F-4. Legislation Affecting the Contractor.**

Chr., J. R. Wemlinger, 11 Broadway, New York City.

### **F-5. Legislation Affecting the Engineer.**

Chr., Wm. L. Bowman, 60 Wall St., New York City.

### **F-6. General Legislation.**

Chr., Wm. B. King, 728 17th St., Washington, D. C.

## **G. COMMITTEE ON ARBITRATION**

Chr., Eugene H. Abadie, Third National Bank Bldg., St. Louis, Mo.  
(Sub-Committee not organized.)

## **H. COMMITTEE ON PLANT AND EQUIPMENT**

(Not organized.)

## **I. COMMITTEE ON LABOR**

(Not organized.)

## **J. COMMITTEE ON DESIGNING AND PLANNING**

(Not organized.)

# SOCIETY AFFAIRS

MARCH, 1913



## NOTICES

The rooms of the Society, on the tenth floor of the Bowling Green Building (11 Broadway), New York City, are open from 9 a. m. until 5 p. m., every day of the week, except Sundays and holidays. On Saturdays they are closed at 2 p. m.

\* \* \* \* \*

The Bowling Green Building is adjacent to the Bowling Green station of the subway, and is within easy reach of the Battery Park station of the 6th and 9th Avenue elevated lines. All Broadway surface cars also pass its doors.

\* \* \* \* \*

The privileges of the library and reading-room are extended to the members of other technical societies, and those who desire to attend any of the regular meetings of the Society will also be heartily welcomed.

\* \* \* \* \*

All members are urged to use the rooms of the Society, and to attend the meetings. Members can have their mail sent in care of the Society. We now have on file in the reading room about sixty of the technical and trade journals.

\* \* \* \* \*

The regular monthly meetings of the Society are held at 8 p. m. on the second Thursday of each month, with the exception of July and August. These meetings are held in room No. 3 on the 5th floor of the United Engineering Building, 25-29 West 39th Street, New York City, unless other arrangements are desirable, in which case members are duly notified.

\* \* \* \* \*

Members advertising for bids on construction work can file plans and specifications at the Society rooms, for the convenience of intending bidders in New York and vicinity. Announcement of such bids will be posted on the Bulletin board and printed in the Journal. The Society will also be glad to receive plans and specifications from non-members.

\* \* \* \* \*

In order to secure the prompt delivery of the Journal of the Society, members are requested to notify the Secretary at once of any change in their mailing address, otherwise the Society will not be responsible for the delivery of publications.

# TECHNICAL STANDARDS COMMITTEES

## GENERAL ADVISORY COMMITTEE

Chairman, Howard J. Cole, 550 Main St., Hartford, Conn.

William B. Bamford, 614 Tenth Ave., Belmar, N. J.

Julius R. Wemlinger, 11 Broadway, New York City.

## A. COMMITTEE ON CONTRACTS

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### A-2. Private Construction Contracts.

Chr., Wm. B. Bamford, 614 10th Ave., Belmar, N. J.

### A-3. Contracts between Contractor and Sub-Contractor.

(Not organized.)

### A-4. Contracts between Contractor and Manufacturer.

Chr., Wm. L. Bowman, 60 Wall St., New York City.

### A-5. Contracts between Owner and Engineer.

Chr., Jerome Cochran, 240 Howard St., Detroit, Mich.

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### B-1. Steel.

Chr., A. L. Johnson, Mutual Life Bldg., Buffalo, N. Y.  
Elie Cannes, 30 Church St., New York City.  
J. R. Wemlinger, 11 Broadway, New York City.

### B-2. Cast Iron.

Chr., O. B. Stauffer, Herzog Iron Wks., St. Paul, Minn.

### B-3. Wrought Iron.

(Not organized.)

### B-4. Minor Metals and their Alloys.

(Not organized.)

### **B-5. Lime and Cement.**

Chr., C. W. Boynton, 72 W. Adams St., Chicago, Ill.  
T. H. Ahlbom, Waterloo, Iowa.  
A. S. Bent, Central Bldg., Los Angeles, Cal.  
E. S. Hanson, 1207 Morton Bldg., Chicago, Ill.  
W. R. Harris, P. O. Box 155, Regina, Sask., Can.  
Coleman Meriwether, 165 Broadway, New York City.  
R. T. Miller, 1330 The Monadnock, Chicago, Ill.

### **B-6. Concrete Aggregate.**

(Not organized.)

### **B-7. Stone.**

W. W. Mack, 1 Madison Ave., New York City.

### **B-8. Wood.**

(Not organized.)

### **B-9. Clay and Terra Cotta.**

(Not organized.)

### **B-10. Paving Materials.**

Chr., Geo. C. Warren, 59 Temple Place, Boston, Mass.

## **C. COMMITTEE ON STANDARD SPECIFICATIONS FOR CONSTRUCTION WORK**

Chairman, DeWitt V. Moore, Merchants Bank Bldg.,  
Indianapolis, Ind.

### **C-1. Work Preliminary to Construction.**

(Not organized.)

### **C-2. Excavation.**

Chr., C. L. Parmelee, 30 Church St., New York City.

### **C-3. Foundations.**

(Not organized.)

### **C-4. Waterproofing.**

Chr., Myron H. Lewis, Municipal Bldg., Long Island City, N. Y.  
C. F. Dingman, 1 Broadway, New York City.  
Charles Freund, 11 Broadway, New York City.  
W. P. Taylor, Great Neck Sta., L. I., N. Y.

### **C-5. Fireproofing.**

Chr., Arthur Hardoncourt, Jr., P. O. Box 71, Station L, Brooklyn, N. Y.

### **C-6. Roofing.**

(Not organized.)

## **C-7. Highway Construction.**

Chr., F. B. Bosch, Commonwealth Trust Bldg., Harrisburg, Pa.  
Howard Egleston, Hibernia Bank Bldg., New Orleans, La.  
C. F. Gillis, P. O. Box 1576, Saskatoon, Sask., Can.  
E. M. Seitz, Goff Bldg., Camden, N. J.  
W. B. Spencer, 2 Rector St., New York City.  
Howell Topping, 189 Willoughby Ave., Brooklyn, N. Y.,  
G. C. Warren, 59 Temple Pl., Boston, Mass.

## **C-8. Highway Maintenance.**

Chr., Carl Weber, 312 Forum Bldg., Sacramento, Cal.  
F. B. Earl, 17 Battery Pl., New York City.  
L. F. Peck, 432 Edgewood St., Hartford, Conn.  
G. C. Scales, County Engineer, Marion, Ala.  
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## **C-11. Bridges.**

Chr., Daniel B. Luten, Traction Terminal Bldg., Indianapolis, Ind.

## **C-12. Buildings.**

(Not organized.)

## **C-13. Dams.**

Chr., Edward Wegmann, Park Row Bldg., New York City.

## **C-14. Harbor Improvements.**

Chr., Henry F. Alexander, P. O. Box 312, Lorain, Ohio.  
A. R. Crookshank, P. O. Box 336, St. John, N. B., Can.  
H. A. Paquette, P. O. Box 93, Lewis, Que., Can.  
J. K. Scammell, P. O. Box 321, St. John, N. B., Can.  
C. McN. Steeves, P. O. Box 336, St. John, N. B., Can.  
S. W. Stewart, 40 Central St., Boston, Mass.  
A. G. Tapley, Custom House, St. John, N. B., Can.  
J. H. Tromanhauser, 604 Temple Bldg., Toronto, Ont., Can.

## **C-15. Dredging and Hydraulic Work.**

Chr., H. C. Lyons, 15 William St., New York City.

## **C-16. Hydro-Electric Construction.**

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## **C-17. Drainage and Irrigation.**

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**C-19. Sewerage.**

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G. M. Eady, 610 Inter-Southern Bldg., Louisville, Ky.

J. J. Fusco, 671 Broad St., Newark, N. J.

H. C. Gass, Contractor, Waco, Tex.

Edward Horstmann, Jr., Kearny, N. J.

J. M. Mackay, Trunk Sewer Dept., Regina, Sask., Can.

R. L. Russell, 37 Liberty St., New York City.

F. A. Snyder, 17 West 42nd St., New York City.

J. M. Solomon, Jr., 30 No. Seventh St., Philadelphia, Pa.

W. W. Young, 220 Broadway, New York City.

**C-20. Tunnels.**

Chr., B. M. Laughead, McDonald, Washington Co., Pa.

Ernest Wanamaker, 105 S. La Salle St., Chicago, Ill.

**C-21. Concrete Construction.**

(Not organized.)

**C-22. Reinforced Concrete Construction.**

(Not organized.)

**C-23. Masonry Construction.**

(Not organized.)

**C-24. Steel Construction.**

(Not organized.)

**C-25. Timber Construction.**

(Not organized.)

**D. COMMITTEE ON COST DATA**

Chairman, Halbert P. Gillette, 608 South Dearborn St.,  
Chicago, Ill.

**D-1. Cost Analysis.**

Chr., DeWitt V. Moore, Merchants Bank Bldg., Indianapolis, Ind.

C. C. Brown, Commercial Club Bldg., Indianapolis, Ind.

A. F. Byers, 65 Victoria St., Montreal, Que., Can.

William O'Malley, Prado 93A, Havana, Cuba.

S. E. Thompson, Odd Fellows Bldg., Newton Highlands, Mass.

**D-2. Cost Accounting.**

Chr., Howard J. Cole, 550 Main St., Hartford, Conn.

R. T. Dana, 15 William St., New York City.

C. E. Jacoby, 515 Shukert Bldg., Kansas City, Mo.

H. P. Seiderman, U. S. R. S., Washington, D. C.

Wilmer Waldo, Union National Bank Bldg., Houston, Tex

## **E. COMMITTEE ON SCIENTIFIC MANAGEMENT**

Chairman, Richard T. Dana, 15 William St., New York City.  
(Sub-Committees Not Organized.)

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Chairman, Cassius E. Gillette, Land Title Bldg., Philadelphia, Pa.

### **F-1. Public Construction Contracts Law.**

Chr., C. E. Gillette, Land Title Bldg., Philadelphia, Pa.

### **F-2. Private Construction Contracts Law.**

Chr., Wm. B. Bamford, 614 Tenth Ave., Belmar, N. J.

### **F-3. Legislation Affecting Labor.**

Chr., W. R. Harris, P. O. Box 155, Regina, Sask., Canada.

### **F-4. Legislation Affecting the Contractor.**

Chr., J. R. Wemlinger, 11 Broadway, New York City.

### **F-5. Legislation Affecting the Engineer.**

Chr., Wm. L. Bowman, 60 Wall St., New York City.

### **F-6. General Legislation.**

Chr., Wm. B. King, 728 17th St., Washington, D. C.

## **G. COMMITTEE ON ARBITRATION**

Chr., Eugene H. Abadie, Third National Bank Bldg., St. Louis, Mo.  
(Sub-Committee not organized.)

## **H. COMMITTEE ON PLANT AND EQUIPMENT**

(Not organized.)

## **I. COMMITTEE ON LABOR**

(Not organized.)

## **J. COMMITTEE ON DESIGNING AND PLANNING**

(Not organized.)

# EMPLOYMENT

Actuated by a desire to be of direct assistance to all of its members in securing better positions, the Society earnestly solicits applications both for positions and for men available. This department is under the personal supervision of the Secretary, and all applications are carefully numbered and placed on file at the headquarters of the Society. The list of men available is made up wholly of members of the Society, and as such is entirely dependable. The Secretary will be glad to furnish full information upon request.

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## MEN AVAILABLE

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\* \* \* \* \*

010. Member of the Society, technical education, with seven years' practical experience, desires position with engineer or architect as building or concrete inspector. Is 25 years old and married. Has good executive ability and is thoroughly proficient in the theory and practice of structural design and construction, heating, ventilation, electric wiring, etc. Experience covers location and construction on railroad work; design, supervision and construction of reinforced concrete and steel structures, bridge work, sewers, paving, cost analysis, surveys, examinations and reports. Is familiar with the various methods of reinforcement. Tropical experience, speaks and writes Spanish, no objection to location in Mexico or South America. At present in contracting business for himself, however, is financially unable to meet competition. Salary to be commensurate with services rendered or required. Can report on reasonable notice. Will consider opening with construction company offering opportunity for advancement. Own drawing and surveying outfit.

\* \* \* \* \*

011. Member of the Society, specialist in concrete construction, is open for engagement with large contracting concern, as General Manager or Estimator and Chief Engineer, at initial salary of \$200 per month. Graduated in Civil Engineering at the University of Christiania, Norway, and had two years special course in the University of Berlin. Was for five years City Engineer in Norway. Has had ten years experience in this country, as Consulting Engineer in private practice and as Chief

Engineer of large contracting concerns engaged in concrete construction, etc. Is at present employed in latter capacity. Can furnish best of references. Write Secretary for particulars.

\* \* \* \* \*

012. Member of the Society, thirty-eight years old, who has had fifteen years practical experience in hydro-electric construction, power plant design, reinforced concrete construction, structural steel work, surveys, etc., is open for engagement. Has business ability and tact. Is at present employed, and can furnish best of references. Write Secretary for further information.

\* \* \* \* \*

013. Civil Engineer, member of the Society, at present located in India, will be available in March or April. Excellent executive ability. Long experience in foreign countries. Speaks Spanish and French. Expert in reinforced concrete design and construction. Desires to locate in United States or West Indies, but engagement in any country will be considered. Will accept commissions to make investigations and reports on any works or subject of an engineering nature in any country. Considerable experience as foreign representative. Full particulars may be had by addressing the Secretary of the Society.

\* \* \* \* \*

014. Contractors and Engineers often have rush jobs on bids, designs and other work, making it convenient, and sometimes necessary, to have an extra man or men for a short period. An engineer of ten years' experience, a member of the Society, residing in New York, desires odd work of this nature,—methods of doing work, estimates, computations and designs. Will also furnish additional men when desired. Write or telephone the Secretary.

\* \* \* \* \*

015. Civil and survey engineer, member of the Society, 30 years old and married, wishes to locate in New England or the North Atlantic States on highway, concrete or hydro-electric construction, or with engineer or contractor where part of time would be spent on making surveys and investigations, and the remainder of time making plans, estimating, designing, etc. Has had

experience as instrument man and computer on highway, drainage, land and topographical surveys; as assistant locating engineer on railroad surveys and estimates; as engineer and superintendent of construction on highway and bridge work; as draughtsman, transit-man and chief of party on water power development surveys and intra-coastal surveys under the War Department. Is at present employed in the resident engineer's office of an important Eastern railroad. Can supply own drawing instruments, transit, tapes, etc., and will consider minimum salary of \$125.00 per month. Address the Secretary for full information and references.

\* \* \* \* \*

016. Member of the Society, at present Secretary of a large excavation construction company, with additional duties as cost expert, auditor, and chief engineer, desires to make a change. Has good knowledge of systematizing and cost analysis, having installed two very complete systems. Thorough engineering training in irrigation, railroad, highway, and municipal work, and in addition to position named above is at present Deputy County Surveyor of a western county, which lacks only a few square miles of being as large as the State of Delaware. Has acted as Chief Engineer on highway work and as Assistant Chief Engineer on irrigation work. Experience as both engineer and contractor has enabled him to work to better advantage in both capacities. Has been Superintendent on large railroad contract, and has a reputation for economic handling of work. Location no bar. Salary to be commensurate with services rendered or required. For further information address the Secretary.

\* \* \* \* \*

017. Member of this Society and of the American Society of Civil Engineers. Graduate Civil Engineer, 38 years of age with 16 years' experience covering railroad construction, docks, bridges, pile driving, concrete, etc. During the past 8 years has been chief engineer and superintendent of construction both with railroads and with contractor. Has had experience in the tropics and speaks German and Spanish. Good executive and organizer, and can furnish the best of references. At present employed, but desires to change. Location immaterial.

# READING ROOM

(Open 9 A. M. to 5 P. M.)

## ENGINEERING

- \*Canadian Engineer
- Cassier's Magazine
- Chemical Engineer
- Domestic Engineer
- Engineering
- Engineering Law
- Engineering News
- Engineering Record
- Municipal Engineering
- Municipal Journal

## †The Engineer

- The Engineering Magazine
- The Excavating Engineer
- The Irrigation Age
- Western Engineering

## CONTRACTING

- \*Contract Record & Engineering Review
- Engineering & Contracting
- Southwest Contractor & Manufacturer
- The American Contractor
- The Contractor

## RAILWAYS

- Electric Railway Journal
- Railway Age Gazette
- Railway & Locomotive Engineering
- Railway Engineering & Maintenance of Way
- Street Railway Bulletin
- The Railway & Engineering Review

## MINING

- Mines and Minerals
- Mining World
- Mining Science
- Mining and Scientific Press
- \*The Canadian Mining Journal

## UNIVERSITY AND SOCIETY JOURNALS

- Quarterly Bulletin, Bureau of Public Works, Manila, P. I.
- Journal of the American Society of Mechanical Engineers
- Journal of the Cleveland Engineering Society
- Proceedings of the Engineers' Club of Philadelphia
- Proceedings of Indiana Engineering Society
- Professional Memoirs, Corps of Engineers, U. S. Army
- \*Manitoba Engineer (University of Manitoba)
- Applied Science (Toronto University)
- Cornell Civil Engineer
- Yale Scientific Monthly

†British

\*Canadian

## ARCHITECTURE AND BUILDING

- Architecture & Building
- Building Age
- Pacific Builder & Engineer
- Stone
- The American Architect
- The Architect & Engineer
- The Architectural Record

## CEMENT AND CONCRETE

- Cement
- Cement Era
- Cement Record
- Cement & Engineering News
- Cement World
- Concrete—Cement Age
- †Concrete & Constructional Engineering
- Rock Products
- The Concrete Age
- The Clayworker

## GAS, ELECTRICITY AND STEAM

- American Gas Light Journal
- Electrical Review
- Southern Electrician
- Steam

## MISCELLANEOUS

- Barge Canal Bulletin
- Canal Record (Isthmian Canal)
- \*Canadian Machinery
- Compressed Air
- Good Roads
- Industrial World
- Steam Shovel & Dredge
- The Improvement Bulletin
- The Industrial Magazine
- The Scientific Digest

## 36

## LOOK THIS LIST OVER

Help us to locate any of the men whose names you find in this list and it will be greatly appreciated. Their present addresses are unknown to us and they are therefore not receiving the JOURNAL. Do you know where any of them are at present? If so please communicate to the Secretary any information that you may have regarding these members. The addresses given are those to which the JOURNAL has been regularly mailed and has eventually come back marked with the Post Office stamp "NOT HERE."

BILLINGS, FRED M., c/o Oliver Cuban Const. Co.,  
Manzanillo, Cuba.

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## SOCIETY NOTES

The name of the author of the paper in last month's issue entitled "Legal Questions Involved in the Proposed Amendment to the General Municipal Law of New York" was erroneously published as Wm. M. Bowman. The Society desires to state that the author was William Law Bowman, a Cornell Civil Engineer and Harvard law graduate. Mr. Bowman is the son of former Congressman Charles C. Bowman of Pennsylvania, and a recognized expert and specialist in architectural and engineering jurisprudence. As author of "Partnership Agreements for Engineers" he was awarded the 1911 Fuertes graduate medal for original research by the College of Civil Engineering, Cornell University. He is author also of the following papers: "Legal Hints for Architects," "Architectural Jurisprudence," "The Engineer and the Law." His law offices are at 60 Wall Street, New York City.

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### A WORTHY EDITORIAL

Mr. William B. King's report as Chairman of Committee A-1, Public Construction Contracts, published in the March issue of the JOURNAL, was reprinted by several technical papers.

The Editor of *Municipal Journal* comments on the same in an editorial in the July 10th number of that publication, from which the following has been extracted:

We publish in this issue the report of a committee of the American Society of Engineering Contractors discussing the subject of contracts, and changes which are desirable in their general form from the viewpoint of the contractor. The committee calls attention to the fact that practically all contracts have been prepared by engineers who, although they have generally endeavored to be fair and just to both parties, are apt to be more or less biased by the fact that they are employed by the party paying for the work rather than by the one who performs it, and to view the subject from the standpoint of obtaining what is desired from the contractor rather than of securing what is due him.

There have undoubtedly been in the past many clauses and provisions unjust to contractors, many of which, however, have been overruled by the courts and others of which it is generally understood will not be enforced (all of which should, therefore, be omitted); but a number still remain which are objectionable to contractors, some, undoubtedly, with reason.

A provision by which the contractor would be protected from loss caused by delay on the part of the owner or the owner's other contractors is certainly a fair one. Numerous instances could be cited where the loss of interest on the plant tied up in delayed work and salaries of foremen and other employees which it is necessary to keep on the payroll, etc., have more than eaten up the benefits which the contractor would otherwise have made.

Concerning the contention that the owner or party of the first part should guarantee local conditions, such as depth and character of rock, etc., is open to question. In the case of a city street, for instance, we cannot see that the city need be more familiar with the conditions than the contractor, or be in any way responsible for them. On the other hand, the contractor would appear to be entitled to payment for any work which is found necessary in connection with excavating for or otherwise carrying out his contract. It would seem possible to meet this point by providing items in the contract covering all material and work which may be anticipated, with a provision for payment on a payroll basis with allowance for supervision, use of tools, etc., for any character of work which is not anticipated or which it is difficult to fix a unit price upon.

A provision that the contractor's bond should protect the parties furnishing the materials and labor to the contractor seems to us undesirable. This would increase the cost to the contractor of furnishing bond for the work, an increase which is entirely unnecessary in the case of the contractor of established credit, and in case of others, the material men themselves could require bond of the contractor—at any rate, this is a business matter between the contractor and the material man which it does not seem necessary or advisable for the city to form a third party to.

In general, however, the ideas contained in this report seem to us to be admirable. There are too many cases of inexperienced engineers and of city officials timid in assuming responsibility, attempting to place all possible losses upon the contractor, even those for which he is in no way responsible; and if a standard form of contract were generally adopted and recognized, it would be much easier for contractors to insist upon and secure the substitution of such form for any unjust contract.

## THE ENLARGED SEPTEMBER ISSUE

In order to increase the value and usefulness of the Journal, to the members of this Society, the Board of Direction has considered and passed a resolution adopting some important changes and improvements in the present arrangement of the Society's publication. Among these is the enlarging of its size to the standard generally adopted by the technical press, viz., 9 by 12 inches, making it possible to furnish a publication that will combine much more matter than heretofore, without virtually increasing its cost.

The intention of the Board in enlarging the Society Journal, incorporating new departments which will make the publication more generally interesting, and changing its name to the Engineering-Contractor, is to give prestige to the Society's work.

As the Society's publication is practically the only means of communication we have with out-of-town members, or members residing in distant parts, the Board deemed it advisable to make it a medium of which they shall be justly proud. It will contain as heretofore all things of interest in connection with the Society, also a review of current topics. Other departments to be incorporated will be, Consultation Bureau, Engineering Law, Etc. We are in hopes that the publication will be of such interest that it will arouse a greater feeling of brotherhood and unity, and make closer the bond between Engineering and Contracting members. We also feel that the Society's work will receive greater recognition by outsiders and as our publication is a standard by which our activities are gauged, we are sure that the Society will grow in numbers and will stand as a big and mighty power in the Engineering-Contracting field.

The Board sincerely hopes that their efforts in launching a publication of this kind will be strengthened by the active co-operation of the members.

## "HUMAN NATURE ON CONSTRUCTION WORK"

In the September issue, we will publish Mr. C. H. Hollingsworth's paper, "Human Nature on Construction Work," which has been so widely discussed and favorably commented upon in Engineering Circles.

Human Nature is a factor that is only too seldom figured in on a construction job. Frank B. Gilbreth's motion study has made some Engineers and Contractors consider a man's efficiency as a working unit from the standpoint of eliminating waste motions, thereby saving time and money. Other efficiency methods have also been taken into consideration. Some have met with success, others have been a failure, mainly because human nature was overlooked in many of the efficiency formulas. Human nature plays a big part in construction work, of any character, and the lack of appreciation of its proper effect on construction work, has been the cause of many strikes and great losses to contractors. Let dissension brew in the ranks of the laborers and in the course of a very short time a strike may be called, and the result is either great inconvenience to the contractor or total failure. Mr. Hollingsworth considers ways and means to prevent grievances arising among those employed by the Contractor, thereby facilitating the smooth running of the plant.

This paper is a most thorough and interesting treatise on the psychology of men connected with construction work, from the contractor down to the "mucker" and "sand hog." The author deals with this subject in a manner which denotes his keen observation of men and of their ways. That he is not a novice in the study of human nature is exemplified in the logical, forcible and convincing arguments he puts forth. His literature is not of the dry, dreary kind, but is full of life and color, and has a humorous side which to us seems worthy of the late Mark Twain.

Taking all things into consideration, we are sure that there is not a member who, after he has thoroughly digested this paper, will not feel like Oliver Twist when he said, "I want some more."

NOTE:

"THE JOURNAL OF THE AMERICAN  
SOCIETY OF ENGINEERING CONTRACTORS"

is now known as

"THE ENGINEERING CONTRACTOR".

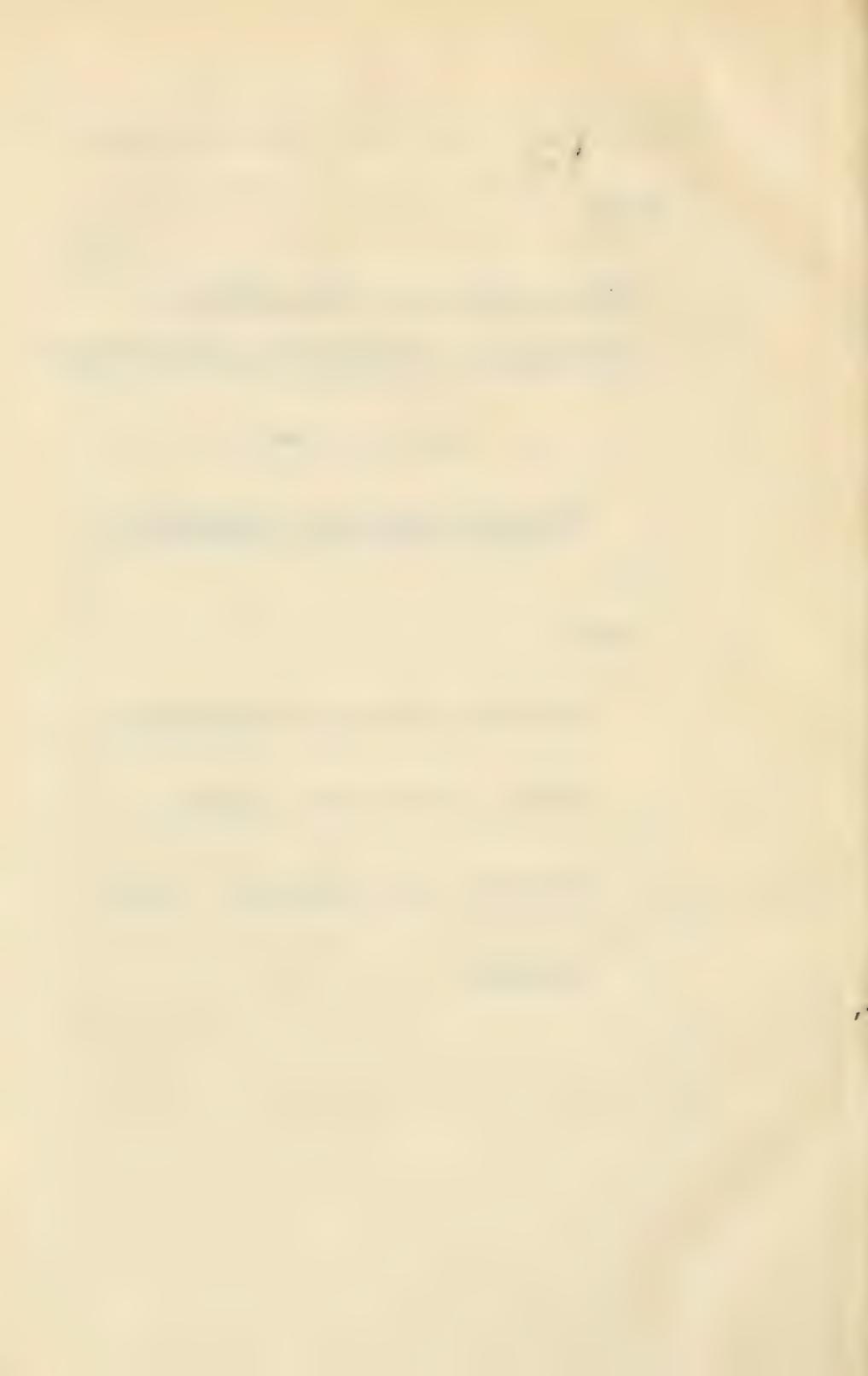
See -

"The Engineering Contractor"

Vols. 1-2 for the October,

November and December, 1912,

numbers.







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